



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/700,409	03/21/2022	John Douglas STEINBERG	230-002-CON	5915
144465	7590	11/22/2023	EXAMINER	
Tanner IP, PLLC			LAU, TUNG S	
149 West Gilpin Avenue				
Norfolk, VA 23503				
			ART UNIT	PAPER NUMBER
			2857	
			NOTIFICATION DATE	DELIVERY MODE
			11/22/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dan@tannerip.com
eofficeaction@appcoll.com
james@tannerip.com

Notice of Abandonment	Application No. 17/700,409	Applicant(s) STEINBERG et al.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on 17 March 2023.
 - (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
 - (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a *bona fide* attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 8 below).
 - (d) ☒ No reply has been received.
2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) ☐ The submitted fee of \$ _____ is insufficient. A balance of \$ _____ is due. The issue fee required by 37 CFR 1.18 is \$ _____. The publication fee, if required by 37 CFR 1.18(d), is \$ _____.
 - (c) ☐ The issue fee and publication fee, if applicable, has not been received.
3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) ☐ No corrected drawings have been received.
4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33(b). See 37 CFR 1.138(b).
5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.
6. ☐ The decision by the Patent Trial and Appeal Board rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7. ☐ The dismissal of the appeal in an application having no allowed claims. (When an appeal is dismissed in an application having no allowed claims the application stands abandoned. See MPEP 1215.04 subsections I-V for an explanation of the reasons why an appeal is dismissed.)
8. ☐ The reason(s) below:

/ANGELA S WHITE/

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

U.S. Patent and Trademark Office

PTOL-1432 (Rev. 04-19)

Notice of Abandonment

Part of Paper No. 202311171

Electronic Patent Application Fee Transmittal

Application Number:	17700409			
Filing Date:	21-Mar-2022			
Title of Invention:	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM			
First Named Inventor/Applicant Name:	John Douglas STEINBERG			
Filer:	Daniel Albert Tanner			
Attorney Docket Number:	230-002-CON			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	1253	1	1480	1480
Miscellaneous:				
Total in USD (\$)				1480

Electronic Acknowledgement Receipt

EFS ID:	48597747
Application Number:	17700409
International Application Number:	
Confirmation Number:	5915
Title of Invention:	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM
First Named Inventor/Applicant Name:	John Douglas STEINBERG
Customer Number:	144465
Filer:	Daniel Albert Tanner
Filer Authorized By:	
Attorney Docket Number:	230-002-CON
Receipt Date:	17-SEP-2023
Filing Date:	21-MAR-2022
Time Stamp:	22:58:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1480
RAM confirmation Number	E20239GM59105803
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Fee Worksheet (SB06)	fee-info.pdf	38503	no	2
			f3f9ca9d98e641071de9c242a25646abeb1864a4		
Warnings:					
Information:					
Total Files Size (in bytes):			38503		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/700,409	03/21/2022	John Douglas STEINBERG	230-002-CON	5915

144465 7590 03/17/2023
Tanner IP, PLLC
149 West Gilpin Avenue
Norfolk, VA 23503

EXAMINER

LAU, TUNG S

ART UNIT	PAPER NUMBER
----------	--------------

2857

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

03/17/2023

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dan@tannerip.com
eofficeaction@appcoll.com
james@tannerip.com

Office Action Summary

Application No.

17/700,409

Applicant(s)

STEINBERG et al.

Examiner

TUNG S LAU

Art Unit

2857

AIA (FITF) Status

No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 03/21/2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2a) ☐ This action is **FINAL**.

2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☒ Claim(s) 1 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☒ The drawing(s) filed on 03/21/2022 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some** c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

3) ☒ Interview Summary (PTO-413)

Paper No(s)/Mail Date ____.

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)

4) ☐ Other: ____.

Paper No(s)/Mail Date ____.

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Continuing Data

1. Appears the parent case 16/374,083 has a third party submission and Petition Requesting Trial, See interview summary.

Information Disclosure Statement

2. Numerous references listed in the Information Disclosure Statement filed on the previous case have been considered by the examiner.

The numerous IDS submitted contain this case appears lengthy and very complex. The examiner has considered the references to the extent reasonably expected during normal examination time. **(If applicant considers there is a particular reference or teaching particularly relevant to the claimed invention it is requested from the applicant to provide a statement indicating such relevance and a clear identification of such reference).**

Consideration by the examiner of the information submitted in an IDS means nothing more than considering the documents in the same manner as other documents in Office search files are considered by the examiner while conducting a search of the prior art in a proper field of search. (see MPEP 609)

"voluminous references" submitted by the applicant. In this case just over 75 references were submitted may not comply with Applicant's duty of disclosure

[T]he cloaking of a clearly relevant reference by inclusion in a long list of citations may not comply with the Applicant's duty of disclosure. *Penn Yan Boats, Inc. v. Sea Lark Boats, Inc.*, 359 F. Supp. 948 (S.D. Fla. 1972). . . . accord with dicta from *Molins PLC v. Textron, Inc.*, 48 F.3d 1172 (Fed. Cir. 1995), stating that forcing the Examiner to find "a needle in a haystack" is "probative of bad faith." *Id.* [The *Molins*] case presented a situation where the disclosure was in excess of 700 pages and contained more than fifty references.

In *Golden Valley Microwave Foods Inc. v. Weayer Popcorn Co. Inc.*, the court held the patent-in-suit unenforceable due to inequitable conduct where the patentee submitted a material reference "in a series of disclosures of less relevant prior art references, so that the examiner would be likely to ignore the entire list and permit the application to issue." 837 F. Supp. 1444, 1477 (N.D. Ind. 1992). failed to highlight to the examiner that one of the two "buried" patents disclosed a particularly relevant embodiment that covered the same subject matter as a pending claim. *Id.* at 1457, 1477.

Similarly, in *Penn Yan Boats Inc. v. Sea Lark Boats Inc.*, the patentee submitted to the USPTO a material reference as one of 13 references that were allegedly discovered in a pre-examination search. 359 F. Supp. 948, 964 (D.C. Fla. 1972), *aff'd* without op., 479 F.2d 1328 (5th Cir.1973), *cert. denied*, 414 U.S. 874 (1973).

The court found such representation to be false because the material reference did not issue until more than a year after the prosecution started and, therefore, could not have been discovered in a pre-examination search. *Id.*

The court subsequently held the patent unenforceable because "the purpose of this misrepresentation was to bury [that reference] in a long list of allegedly old prior art patents in the hope that the patent examiner ... would ignore the list and permit the [patent-in-suit] to issue." *Id.* at 965.

Best to avoid perception of concealment of information (IDS submitted to the office) that the Examiner could not have discovered on his own (*Nevro Corp. v. Boston Scientific Corp.* (N.D. Cal. 2017))

Applicant is reminded of section 2004, paragraph 13, of the MPEP.

It is desirable to avoid the submission of long lists of documents if it can be avoided. Eliminate clearly irrelevant and marginally pertinent cumulative information. If a long list is submitted, highlight those documents which have been specifically brought to applicant's attention and/or are known to be of most significance. See *Penn Yan Boats, Inc. v. Sea Lark Boats, Inc.*, 359 F. Supp. 948, 175 USPQ 260

(S.D. Fla. 1972), *aff'd*, 479 F.2d 1338, 178 USPQ 577 (5th Cir. 1973), *cert. denied*, 414 U.S. 874 (1974). But cf. *Molins PLC v. Textron Inc.*, 48 F.3d 1172, 33 USPQ2d 1823 (Fed. Cir. 1995).

Applicant(s) inundated the Examiner with a large volume of prior art that is not material and may obscure a single reference that is material and thus may be effective as improper as withholding a material reference. *Ex Parte Morning Surf Corp.*, 230 USPQ 446, and *Penn Yan Boats, Inc. v. Sea Lark Boats, Inc.*, 359 F. Supp. 948, 175 USPQ 260 (S.D. Fla. 1972).

“Significantly, an applicant’s duty of disclosure of material and information is not satisfied by presenting a patent examiner with “a mountain of largely irrelevant [material] from which he is *presumed* to have been able, with his expertise and with adequate time, to have found the critical [material]. It ignores the real world conditions under which examiners work.” *Rohm & Haas Co. v. Crystal Chemical Co.* 722 F.2d 1556, 1573 [220 USPQ 289], (Fed.Cir., 1983)
(The following is an excerpt from MPEP 609:

“Although a concise explanation of the relevance of the information is not required for English language information, applicants are encouraged to provide a concise explanation of why the English-language information is being submitted and how it is understood to be relevant. Concise explanations (especially those which point out the relevant pages and lines) are helpful to the Office, particularly where documents are lengthy and complex and applicant is aware of a section that is highly relevant to patentability or where a large number of documents are submitted and applicant is aware that one or more are highly relevant to patentability.” (MPEP 609))

Citation of Relevant Prior Art

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See MPEP 707.05. Although the prior art discloses several unclaimed, some claimed limitation, for example:

Rayburn (US 7099748 B2, DATE PUBLISHED: 2006-08-29) describes a method of controlling operation of a HVAC&R device to bring an interior temperature for a structure to a predetermined temperature setting at a predetermined time each day. The steps of the method include: sensing a temperature both inside and outside a structure; calculating a preliminary recovery time for a HVAC&R device to drive the sensed temperature inside the structure to a predetermined temperature setting, the preliminary recovery time calculation being obtained by multiplying a difference between the sensed temperature inside the structure and the predetermined temperature setting by a previously calculated air treatment rate; calculating a correction factor based upon multiplying a predetermined value by a difference between the sensed outside temperature and a previously sensed outside temperature; calculating a corrected recovery time based on a sum of the calculated preliminary recovery time and the correction factor; determining a starting time by subtracting the corrected recovery time from a predetermined time; and initiating operation of the HVAC&R device at the starting time.

(8) The present invention further includes a controller for controlling operation of an HVAC&R device to bring an interior temperature for a structure to a predetermined temperature at a predetermined time each day. The controller includes a first sensor for sensing a temperature inside a structure and a second sensor for sensing a temperature outside the structure. A controller is responsive to the first and second sensors and to real time for determining optimum start/stop times so that the structure reaches the second predetermined temperature at substantially the first predetermined time. The controller calculates a preliminary recovery time for a HVAC&R device to drive the sensed temperature inside the structure to a predetermined temperature setting, the preliminary recovery time calculation being obtained by multiplying a difference between the sensed temperature inside the structure and the predetermined temperature setting by a previously calculated air treatment rate. The controller calculates a correction factor based upon multiplying a predetermined value by a difference between the sensed outside temperature and a previously sensed outside temperature, the controller calculating a corrected recovery time based on a sum of the calculated recovery time and the correction factor. The controller initiates operation of the HVAC&R device at a starting time defined by subtracting the corrected recovery time from a predetermined time.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of AIA 35 U.S.C. 102 or pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Wedekind (US 5197666 A, DATE PUBLISHED: mar. 30, 1993).

Regarding claim 1:

Wedekind describes a system for controlling an HVAC system at a user's Building (abstract, fig. 1, HVAC in building), the system comprising: a memory (col. 4, lines 55-60, memory); and one or more processors (col. 4, lines 55-60, computer); the one or more processors configured to receive a first data from at least one sensor (col. 4, lines 55-67, connect to sensor and received data), wherein the first data from the at least one sensor includes a measurement of at least one characteristic of the user's building (col. 4, lines 55-67, inside temperature); the one or more processors further configured to receive a second data from a network connection (col. 4, lines 55-67, outside temperature), wherein the second data from the network connection is collected from a source external to the building; the one or more processors further configured to receive a first temperature set point for the building (fig. 2, occupancy comfort temperature level), wherein the first set point includes a temperature value and a time value; the one or more processors further configured to predict, based at least on the first data from the sensor (fig. 2, time scale predict temperature), the second data from the network connection, and the first temperature set point, the time necessary for the HVAC system to operate in order to reach the temperature value by the time value (col. 6, lines 10-30, the temperature of

the conditioned space 28 has reached a thermal equilibrium with the internal thermal capacitance 55 (internal walls and contents) of the enclosure 30); and the one or more processors further configured to control the HVAC system to operate to cause the building to reach the temperature value by the time value (col. 5-6, line 46-68, t₀, t₁, t₂....1 pm, 5pm, 11pm etc).

Claim Rejections - 35 USC § 101

5. Claim 1 of this application is patentably indistinct from claim 1 of Application No. 16,374.083 now US Patent 10,612,983. Pursuant to 37 CFR 1.78(f), when two or more applications filed by the same applicant or assignee contain patentably indistinct claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the patentably indistinct claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

A rejection based on double patenting of the “same invention” type finds its support in the language of 35 U.S.C. 101 which states that “whoever invents or discovers any new and useful process... may obtain a patent therefor...” (Emphasis added). Thus, the term “same invention,” in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the claims that are directed to the same invention so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Reminds the applicant that Claims for Different Invention Added After an Office Action included RCE (see MPEP 821.03, MPEP § 818.01, § 818.02(a)) may consider restriction by original presentation MPEP 8.04.

Claim 1 (17/700,409, current case)	Claim 1 (16/374, 083 now US Patent 10,612,983)
1. A system for controlling an HVAC system at a user's building, the system comprising: a memory; and one or more processors; the one or more processors configured to receive a first data from at least one sensor, wherein the first data from the at least one sensor includes a measurement of at least one characteristic of the user's building; the one or more processors further configured to receive a second data from a network connection, wherein the second data from the network connection is collected from a source external to the building; the one or more processors further configured to receive a first temperature setpoint for the building, wherein the first	1. A system for controlling an HVAC system at a user's building, the system comprising: a memory; and one or more processors; the one or more processors configured to receive a first data from at least one sensor, wherein the first data from the at least one sensor includes a measurement of at least one characteristic of the user's building; the one or more processors further configured to receive a second data from a network connection, wherein the second data from the network connection is collected from a source external to the building; the one or more processors further configured to receive a first temperature setpoint for the building, wherein the first

setpoint includes a temperature value and a time value; the one or more processors further configured to predict, based at least on the first data from the sensor, the second data from the network connection, and the first temperature setpoint, the time necessary for the HVAC system to operate in order to reach the temperature value by the time value; and the one or more processors further configured to control the HVAC system to operate to cause the building to reach the temperature value by the time value.	setpoint includes a temperature value and a time value; the one or more processors further configured to predict, based at least on the first data from the sensor, the second data from the network connection, and the first temperature setpoint, the time necessary for the HVAC system to operate in order to reach the temperature value by the time value; and the one or more processors further configured to control the HVAC system to operate to cause the building to reach the temperature value by the time value.
---	---

Contact information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S. Lau whose telephone number is 571-272-2274, email is Tungs.Lau@uspto.gov. The examiner can normally be reached on M-F 8-5:30 EDT. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor John Breene, can be reached on **571-272-4107**.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

The fax phone numbers for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application

may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/TUNG S LAU/
Primary Examiner, Art Unit 2862
Technology Center 2800
March 14, 2023

<i>Examiner-Initiated Interview Summary</i>	Application No. 17/700,409	Applicant(s) STEINBERG et al.		
	Examiner TUNG S LAU	Art Unit 2857	AIA (First Inventor to File) Status No	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
TUNG S LAU	Primary Examiner	Telephonic
KING, JOHN	Attorney	

Date of Interview: 14 March 2023

Issues Discussed:

Other

The applicant was not available for discussion of the claims, prior art and 101, however the examiner suggested an interview maybe beneficial to advance prosecution.

/TUNG S LAU/ Primary Examiner, Art Unit 2857	
Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04 Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing	

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

<i>Notice of References Cited</i>	Application/Control No. 17/700,409		Applicant(s)/Patent Under Reexamination STEINBERG et al.	
	Examiner TUNG S LAU		Art Unit 2857	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5197666-A	03-1993	Wedekind; Gilbert L.	F24F11/46	236/94
*	B	US-7099748-B2	08-2006	Rayburn; Ronald Richard	F24F11/62	165/238
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 17/700,409	Applicant(s)/Patent Under Reexamination STEINBERG et al.
	Examiner TUNG S LAU	Art Unit 2857

CPC - Searched*		
Symbol	Date	Examiner
G01K 13/00, F24F 11/30, F24F 11/63, G01M 99/005, F24F 11/47, F24F 11/52, F24F 2130/00, F24F 2130/10	03/14/2023	TL

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Text, class, Inventor, Assignment PE2E search	03/14/2023	TL
PE2E search	03/14/2023	TL
Google Scholar Search	03/14/2023	TL
IP-COM Search	03/14/2023	TL

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G01K 13/00		03/14/2023	TL

/TUNG S LAU/ Primary Examiner, Art Unit 2857	
---	--

Main Concept Text

=====

HVAC building sensor to sense temperature set-point when reach time value

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents
Japan Applications
Korea Patents
Korea Applications
WIPO Applications
Argentina Patents
Argentina Applications
Brazil Patents
Brazil Applications
Canada Patents
Canada Applications
Chile Patents
Chile Applications
Colombia Applications
Costa Rica Applications
Cuba Patents
Cuba Applications
Dominican Republic Applications
Ecuador Patents
Ecuador Applications
El Salvador Applications
Guatemala Applications
Honduras Applications
Mexico Patents
Mexico Applications
Nicaragua Patents
Panama Applications
Peru Applications
Trinidad & Tobago Patents

Uruguay Applications

Austria Patents

Austria Applications

Belarus Patents

Belgium Patents

Belgium Applications

Bosnia & Herzegovina Patents

Bosnia & Herzegovina Applications

Bulgaria Patents

Bulgaria Applications

Croatia Patents

Croatia Applications

Czech Republic Patents

Czech Republic Applications

Czechoslovakia Patents

Czechoslovakia Applications

Denmark Patents

Denmark Applications

Estonia Patents

Estonia Applications

EUIPO Patents

Finland Patents

Finland Applications

France Patents

France Applications

Germany Patents

Germany Applications

Great Britain Patents

Great Britain Applications

Greece Patents
Greece Applications
Hungary Patents
Hungary Applications
Iceland Patents
Iceland Applications
Ireland Patents
Ireland Applications
Italy Patents
Italy Applications
Latvia Patents
Latvia Applications
Lithuania Patents
Lithuania Applications
Luxembourg Patents
Luxembourg Applications
Malta Patents
Monaco Patents
Montenegro Patents
Montenegro Applications
Netherlands Patents
Netherlands Applications
Norway Patents
Norway Applications
Poland Patents
Poland Applications
Portugal Patents
Portugal Applications
Republic of Moldova Patents

Republic of Moldova Applications
Romania Patents
Romania Applications
San Marino Patents
San Marino Applications
Serbia Patents
Serbia Applications
Slovakia Patents
Slovakia Applications
Slovenia Patents
Spain Patents
Spain Applications
Sweden Patents
Sweden Applications
Switzerland Patents
Switzerland Applications
Ukraine Patents
Yugoslavia/Serbia and Montenegro Patents
Yugoslavia/Serbia and Montenegro Applications
Armenia Patents
Australia Patents
Australia Applications
Cyprus Patents
Gulf Cooperation Council Patents
Hong Kong Patents
India Patents
India Applications
Indonesia Patents
Indonesia Applications

Israel Patents
Israel Applications
Jordan Patents
Jordan Applications
Kyrgyzstan Patents
Macao Applications
Malaysia Patents
Mongolia Patents
New Zealand Patents
Philippines Patents
Philippines Applications
Saudi Arabia Patents
Saudi Arabia Applications
Singapore Patents
Singapore Applications
Taiwan Patents
Taiwan Applications
Tajikistan Patents
Tajikistan Applications
Thailand Patents
Thailand Applications
Uzbekistan Patents
Vietnam Patents
Algeria Patents
ARIPO Patents
ARIPO Applications
Egypt Patents
Kenya Patents
Malawi Patents

Morocco Patents

Morocco Applications

OAPI Patents

South Africa Patents

Tunisia Applications

Zambia Patents

Zimbabwe Patents

EAPO Patents

EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications

Main Concept Text

=====

HVAC building system with sensor to sense temperature set-point when reach time value

(No Concept Modifiers)

=====

(No Filters)

=====

Options

=====

De-dup: None

Relevance Cut-off: None

Sort: Relevance

Content: Patent Publications (169)

=====

US Patents

US Designs

US Applications

EPO Patents

EPO Applications

China Patents

China Applications

Japan Patents

Japan Applications

Korea Patents

Korea Applications

WIPO Applications

Argentina Patents

Argentina Applications

Brazil Patents

Brazil Applications

Canada Patents
Canada Applications
Chile Patents
Chile Applications
Colombia Applications
Costa Rica Applications
Cuba Patents
Cuba Applications
Dominican Republic Applications
Ecuador Patents
Ecuador Applications
El Salvador Applications
Guatemala Applications
Honduras Applications
Mexico Patents
Mexico Applications
Nicaragua Patents
Panama Applications
Peru Applications
Trinidad & Tobago Patents
Uruguay Applications
Austria Patents
Austria Applications
Belarus Patents
Belgium Patents
Belgium Applications
Bosnia & Herzegovina Patents
Bosnia & Herzegovina Applications
Bulgaria Patents

Bulgaria Applications
Croatia Patents
Croatia Applications
Czech Republic Patents
Czech Republic Applications
Czechoslovakia Patents
Czechoslovakia Applications
Denmark Patents
Denmark Applications
Estonia Patents
Estonia Applications
EUIPO Patents
Finland Patents
Finland Applications
France Patents
France Applications
Germany Patents
Germany Applications
Great Britain Patents
Great Britain Applications
Greece Patents
Greece Applications
Hungary Patents
Hungary Applications
Iceland Patents
Iceland Applications
Ireland Patents
Ireland Applications
Italy Patents

Italy Applications

Latvia Patents

Latvia Applications

Lithuania Patents

Lithuania Applications

Luxembourg Patents

Luxembourg Applications

Malta Patents

Monaco Patents

Montenegro Patents

Montenegro Applications

Netherlands Patents

Netherlands Applications

Norway Patents

Norway Applications

Poland Patents

Poland Applications

Portugal Patents

Portugal Applications

Republic of Moldova Patents

Republic of Moldova Applications

Romania Patents

Romania Applications

San Marino Patents

San Marino Applications

Serbia Patents

Serbia Applications

Slovakia Patents

Slovakia Applications

Slovenia Patents
Spain Patents
Spain Applications
Sweden Patents
Sweden Applications
Switzerland Patents
Switzerland Applications
Ukraine Patents
Yugoslavia/Serbia and Montenegro Patents
Yugoslavia/Serbia and Montenegro Applications
Armenia Patents
Australia Patents
Australia Applications
Cyprus Patents
Gulf Cooperation Council Patents
Hong Kong Patents
India Patents
India Applications
Indonesia Patents
Indonesia Applications
Israel Patents
Israel Applications
Jordan Patents
Jordan Applications
Kyrgyzstan Patents
Macao Applications
Malaysia Patents
Mongolia Patents
New Zealand Patents

Philippines Patents
Philippines Applications
Saudi Arabia Patents
Saudi Arabia Applications
Singapore Patents
Singapore Applications
Taiwan Patents
Taiwan Applications
Tajikistan Patents
Tajikistan Applications
Thailand Patents
Thailand Applications
Uzbekistan Patents
Vietnam Patents
Algeria Patents
ARIPO Patents
ARIPO Applications
Egypt Patents
Kenya Patents
Malawi Patents
Morocco Patents
Morocco Applications
OAPI Patents
South Africa Patents
Tunisia Applications
Zambia Patents
Zimbabwe Patents
EAPO Patents
EAPO Applications

Georgia Patents

Georgia Applications

Kazakhstan Patents

Kazakhstan Applications

Russia Patents

Russia Applications

Turkey Patents

Turkey Applications



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P. O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5915

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
17/700,409	03/21/2022	702	2857	230-002-CON		
RULE						
APPLICANTS ECOFACTOR, INC., Palo Alto, CA; /TL/						
INVENTORS John Douglas STEINBERG, Millbrae, CA; /TI/ Scott Douglas HUBLOU, Redwood City, CA;						
IPC Classification No. G01K 13/00						
** CONTINUING DATA ***** This application is a CON of 16/806,779 03/02/2020 ABN /TL/ which is a CON of 16/374,083 04/03/2019 PAT 10612983 which is a CON of 15/905,251 02/26/2018 ABN which is a DIV of 14/731,221 06/04/2015 PAT 9939333 which is a CON of 13/861,189 04/11/2013 PAT 9057649 which is a CON of 13/230,610 09/12/2011 PAT 8423322 which is a CON of 12/211,690 09/16/2008 PAT 8019567 which claims benefit of 60/994,011 09/17/2007						
** FOREIGN APPLICATIONS ***** None /TL/						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 03/25/2022						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /TUNG S LAU/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 13	TOTAL CLAIMS 1	INDEPENDENT CLAIMS 1
ADDRESS Tanner IP, PLLC 149 West Gilpin Avenue Norfolk, VA 23503 UNITED STATES						
TITLE SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM						
FILING FEE RECEIVED 1820	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	88	HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 10:41 AM
L2	12	HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 10:41 AM
L3	2	"10612983".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 10:48 AM
L4	5	"7099748".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 10:53 AM
L5	4	"5197666".pn.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:28 AM
L6	12	HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:52 AM
L7	0	(G01K 13/00 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:56 AM
L8	5	(F24F 11/30 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM
L9	5	(F24F 11/63 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM

L10	0	(G01M 99/005 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM
L11	5	(F24F 11/47 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM
L12	5	(F24F 11/52 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM
L13	5	(F24F 2130/00 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:57 AM
L14	5	(F24F 2130/10 .cpc.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:58 AM
L15	1	(ECOFACOR, .as.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:58 AM
L16	1	(ECOFACOR .as.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:58 AM
L17	2	(John near3 Douglas near3 STEINBERG .in.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:59 AM

L18	0	(Scott near3 Douglas near3 HUBLOU .in.) AND HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/03/14 11:59 AM
-----	---	--	--	----	----	----	---------------------

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	5	HVAC WITH building WITH sens\$3 WITH temperature SAME setpoint AND reach\$3 WITH time WITH value	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/14 11:51 AM

Web Search History

date, time	web site	search string
3/14/2023 11:53:52 AM	Google Scholar	HVAC building sensor to sense temperature set-point when reach time value
3/14/2023 11:54:00 AM	Google Scholar	HVAC building system sensor to sense temperature set-point when reach time value



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/700,409	03/21/2022	John Douglas STEINBERG	230-002-CON

CONFIRMATION NO. 5915

PUBLICATION NOTICE



OC000000134996556

144465
Tanner IP, PLLC
149 West Gilpin Avenue
Norfolk, VA 23503

Title:SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

Publication No.US-2022-0214230-A1

Publication Date:07/07/2022

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <https://portal.uspto.gov/pair/PublicPair>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 17/700,409	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(j))	1	minus 20 = *			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 480 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	1820
* If the difference in column 1 is less than zero, enter "0" in column 2.							
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	x =
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
17/700,409	03/21/2022	3763	1820	230-002-CON	1	1

CONFIRMATION NO. 5915

FILING RECEIPT



0000000132718638

144465
Tanner IP, PLLC
149 West Gilpin Avenue
Norfolk, VA 23503

Date Mailed: 03/28/2022

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

John Douglas STEINBERG, Millbrae, CA;
Scott Douglas HUBLOU, Redwood City, CA;

Applicant(s)

ECOFACITOR, INC., Palo Alto, CA;

Power of Attorney: The patent practitioners associated with Customer Number 144465

Domestic Priority data as claimed by applicant

This application is a CON of 16/806,779 03/02/2020
which is a CON of 16/374,083 04/03/2019 PAT 10612983
which is a CON of 15/905,251 02/26/2018 ABN
which is a DIV of 14/731,221 06/04/2015 PAT 9939333
which is a CON of 13/861,189 04/11/2013 PAT 9057649
which is a CON of 13/230,610 09/12/2011 PAT 8423322
which is a CON of 12/211,690 09/16/2008 PAT 8019567
which claims benefit of 60/994,011 09/17/2007

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/25/2022

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/700,409**

Projected Publication Date: 07/07/2022

Non-Publication Request: No

Early Publication Request: No

Title

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

Preliminary Class

236

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor

community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	230-002-CON
	First Named Inventor	John Douglas STEINBERG
	Title	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY...
	Priority Mail Express® Label No.	

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
--	---

1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☐ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages <u>20</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>13</u>] 6. Inventor's Oath or Declaration [Total Pages <u>2</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☐ Newly executed (original or copy) b. ☒ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☒ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee) 12. ☐ English Translation Document (if applicable) 13. ☐ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☐ Other: _____ _____ _____ _____
---	---

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS				
☒ The address associated with Customer Number: <u>144465</u> OR ☐ Correspondence address below				
Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		
Signature	/Daniel A. Tanner, III/		Date	2022-03-21
Name (Print/Type)	Daniel A. Tanner, III		Registration No. (Attorney/Agent)	54734

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

BACKGROUND

[0001] This application is a Continuation of U.S. Patent Application No. 16/806,779, entitled “System And Method For Evaluating Changes In The Efficiency Of An HVAC System,” by Steinberg et al., filed in the U.S. Patent and Trademark Office (“USPTO”) on March 3, 2020, which in turn is a Continuation of U.S. Patent Application No. 16/374,083, filed in the USPTO on April 3, 2019, and issued as U.S. Patent No. 10,612,983 on April 7, 2020, which in turn is a Continuation of U.S. Patent Application No. 15/905,251, filed in the USPTO on February 26, 2018, now abandoned, which in turn is a Division of U.S. Patent Application No. 14/731,221, filed in the USPTO on June 4, 2015, and issued as U.S. Patent No. 9,939,333 on April 10, 2018, which in turn is a Continuation of U.S. Patent Application No. 13/861,189, filed in the USPTO on April 11, 2013, and issued as U.S. Patent No. 9,057,649 on June 16, 2015, which in turn is a Continuation of U.S. Patent Application No. 13/230,610, filed in the USPTO on September 12, 2011, and issued as U.S. Patent No. 8,423,322 on April 6, 2013, which in turn is a Continuation of U.S. Patent Application No. 12/211,690, filed in the USPTO on September 16, 2008, and issued as U.S. Patent No. 8,019,567 on September 13, 2011, which in turn claims the benefit of U.S. Provisional Patent Application No. 60/994,011, filed in the USPTO on September 17, 2007, the disclosures of all of which are hereby incorporated by reference herein in their entirety.

Field of the Invention

[0002] This invention relates to the use of thermostatic HVAC controls that are connected to a computer network. More specifically, communicating thermostats are combined with a computer network in order to evaluate changes in the operational efficiency of an HVAC system over time.

Related Art

[0003] Climate control systems such as heating and cooling systems for buildings (heating, ventilation and cooling, or HVAC systems) have been controlled for decades by thermostats. At the most basic level, a thermostat includes a means to allow a user to set a desired temperature, a means to sense actual temperature, and a means to signal the heating and/or cooling devices to turn on or off in order to try to change the actual temperature to equal the desired temperature. The most basic versions of thermostats use components such as a coiled bi-metallic spring to measure actual temperature and a mercury switch that opens or completes a circuit when the spring coils or uncoils with temperature changes. More recently, electronic digital thermostats have become prevalent. These thermostats use solid-state devices such as thermistors or thermal diodes to measure temperature, and microprocessor-

based circuitry to control the switch and to store and operate based upon user-determined protocols for temperature vs. time.

[0004] These programmable thermostats generally offer a very restrictive user interface, limited by the cost of the devices, the limited real estate of the small wall-mounted boxes, and the inability to take into account more than two variables: the desired temperature set by the user, and the ambient temperature sensed by the thermostat. Users can generally only set one series of commands per day, and in order to change one parameter (e.g., to change the late-night temperature) the user often has to cycle through several other parameters by repeatedly pressing one or two buttons.

[0005] Because the interface of programmable thermostats is so poor, the significant theoretical savings that are possible with them (sometimes cited as 25% of heating and cooling costs) are rarely realized. In practice, studies have found that more than 50% of users never program their thermostats at all. Significant percentages of the thermostats that are programmed are programmed sub-optimally, in part because, once programmed, people tend to not to re-invest the time needed to change the settings very often.

[0006] A second problem with standard programmable thermostats is that they represent only a small evolutionary step beyond the first, purely mechanical thermostats. Like the first thermostats, they only have two input signals - ambient temperature and the preset desired temperature. The entire advance with programmable thermostats is that they can shift between multiple present temperatures at different times.

SUMMARY OF THE INVENTION

[0007] There are many other sources of information that could be used to increase comfort, decrease energy use, or both. For example, outside temperature and humidity strongly affect subjective comfort. On a 95 degree, 90 per cent humidity day in August, when people tend to dress in lightweight clothing, a house cooled to 70 degrees will feel cool or even uncomfortably cold. On a below-freezing day in January, when people tend to wear sweaters and heavier clothes, that same 70 degree home will feel too warm. It would therefore be advantageous for a thermostat system to automatically incorporate information about external weather conditions when setting the desired temperature.

[0008] Thermostats are used to regulate temperature for the benefit of the occupants in a given space. (Usually this means people, but it can of course also mean critical equipment, such as in a room filled with computer equipment.) In general, thermostats read temperature from the sensor located within

the "four corners" of the thermostat. With a properly designed system, the thermostat may well be located such that the temperature read at the precise location of the thermostat accurately reflects the conditions where the human (or other) occupants tend to be. But there are many reasons and circumstances in which that will not be the case. A single thermostat may produce accurate readings in some circumstances but not others; it may be located in a place far from the occupants, or too far from the ductwork controlled by the thermostat, etc. In one house, for example, the thermostat may be located in a spot that receives direct sunlight on hot afternoons. This could cause the thermostat to sense that the local ambient temperature is extremely high, and as a result signal the A/C to run too long, making the rest of the home too cold, and wasting considerable energy. In another house, the thermostat may be located in a hallway without ductwork or where the nearby ducts have been closed. In such a scenario, the thermostat is likely to (correctly) report cold temperatures in the winter, leading the heating system to overheat the rest of the house and waste considerable energy.

[0009] These problems can be reduced or eliminated through use of additional remote temperature sensors connected to the thermostat's control circuitry. However, such systems require additional hardware, additional thermostat complexity, and skilled installation and configuration.

[0010] It would therefore be desirable for a thermostat system using only a single temperature sensor to take such sub-optimal installations into account and to correct for the erroneous readings generated by such thermostats.

[0011] Different structures will respond to changes in conditions such as external temperature in different ways. For example, houses built 50 or more years ago will generally have little or no insulation, be poorly sealed, and have simple single-glazed windows. Such houses will do a very poor job of retaining internal heat in the winter and rejecting external heat in the summer. In the absence of applications of thermal measures such as heating and air conditioning, the inside temperature in such houses will trend to track outside temperatures very closely. Such houses may be said to have low thermal mass. A house built in recent years, using contemporary techniques for energy efficiency such as high levels of insulation, double-glazed windows and other techniques, will, in the absence of intervention, tend to absorb external heat and release internal heat very slowly. The newer house can be thought of as having higher thermal mass than the older house.

[0012] A conventional thermostat has no mechanism by which it might take the thermal mass of the structure into account, but thermal mass significantly affects many parameters relating to energy efficiency.

[0013] The cost to an electric utility to produce power varies over time. Indeed, the cost of production between low demand and peak demand periods can vary by as much as an order of magnitude. Traditionally, residential customers paid the same price regardless of time or the cost to produce. Thus consumers have had little financial incentive to reduce consumption during periods of high demand and high production cost. Many electric utilities are now seeking to bring various forms of variable rates to the retail energy markets. Under such schemes, consumers can reduce costs by taking into account not just how much energy they use, but when they use it

[0014] Thus many consumers now can see real benefits from optimizing not just the total number of kilowatt-hours of electricity consumed, but also optimizing when it is used. The optimum strategy for energy use over time will vary based upon many variables, one of which is the thermal mass of the structure being heated or cooled. In a structure with high thermal mass, heating and cooling can effectively be shifted away from high cost periods to lower cost "shoulder" periods with little or no effect on comfort. If, for example, a utility charges much higher rates on hot summer afternoons, it is likely that pre-cooling a high-thermal mass structure just before the high-cost period and then shutting down the air conditioning during the peak will allow the house to remain comfortable. But in a house with low thermal mass, the benefits of pre-cooling will quickly dissipate, and the house will rapidly become uncomfortable if the air conditioning is shut off. Thus it would be advantageous for a temperature control system to take thermal mass into account when setting desired temperatures.

[0015] Many factors affect the efficiency of HVAC systems. Some may be thought of as essentially fixed, such as the theoretical efficiency of a central air conditioner (often expressed as its SEER rating), the matching of a given system to the characteristics of a given home, the location and size of forced-air ductwork, etc. Other contributors to efficiency are more dynamic, such as clogged filters, refrigerant leaks, duct leakage and "pop-offs," and the like.

[0016] Most of these problems are likely to manifest themselves in the form of higher energy bills. But the "signature" of each different problem can be discerned from the way in which each such problem affects the cycle times of a given HVAC system over time and relative to weather conditions and the performance of other HVAC systems in other houses. If two otherwise identical houses are located next

door to each other and have gas furnaces, but one is rated at 50,000 BTUs and the other is rated at 100,000 BTUs, the cycle times for the higher-capacity furnace should be shorter than for the lower-capacity unit. If both of those same houses have identical furnaces, but one has a clogged filter, the cycle times should be longer in the house with the clogged filter. Because cycling of the HVAC system is controlled by the thermostat, those differences in cycle time would be reflected in the data sensed by and control signals generated by the thermostat. It would be advantageous for a thermostat system to be able to use that information to diagnose problems and make recommendations based upon that data.

[0017] These needs are satisfied by at least one embodiment of the invention that includes a system for calculating a value for the effective thermal mass of a building comprising: at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time; calculating one or more rates of change in temperature at said first location; and relating said calculated rates of change to said outside temperature measurements.

[0018] Another embodiment includes a system for calculating a value for the operational efficiency of an HVAC system comprising at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time; calculating one or more rates of change in temperature at said first location for periods during which the status of the HVAC system is "on"; calculating one or more rates of change in temperature at said first

location for periods during which the status of the HVAC system is "off"; and relating said calculated rates of change to said outside temperature measurements.

[0019] A further embodiment includes a system for evaluating changes in the operational efficiency of an HVAC system over time comprising at least one HVAC control system that measures temperature at at least a first location conditioned by said HVAC system, and reporting said temperature measurements as well as the status of said HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said HVAC control systems and compare said temperature measurements from said first location with expected temperature measurements wherein the expected temperature measurements are based at least in part upon past temperature measurements obtained by said HVAC control system and said outside temperature measurements; and one or more databases that store at least said temperatures measured at said first location over time.

[0020] A further embodiment includes a system for detecting and correcting for anomalous behavior in HVAC control systems comprising a first HVAC control system that measures temperature at at least a first location conditioned by said first HVAC system, and reporting said temperature measurements as well as the status of said first HVAC control system; at least a second HVAC control system that measures temperature at at least a second location conditioned by said second HVAC system, and reporting said temperature measurements as well as the status of said second HVAC control system; one or more processors that receive measurements of outside temperatures from at least one source other than said first and second HVAC control systems and compare said temperature measurements from said first HVAC controls system and said second HVAC control system and said outside temperature measurements; and one or more databases that store said temperatures measurements.

[0021] In at least one embodiment, the invention comprises a thermostat attached to an HVAC system, a local network connecting the thermostat to a larger network such as the Internet, and one or more additional thermostats attached to the network, and a server in bi-directional communication with a plurality of such thermostats. The server logs the ambient temperature sensed by each thermostat vs. time and the signals sent by the thermostats to their HVAC systems. The server preferably also logs outside temperature and humidity data for the geographic locations for the buildings served by the connected HVAC systems. Such information is widely available from various sources that publish detailed weather information based on geographic areas such as by ZIP code. The server also stores other data affecting the load upon the system, such as specific model of HVAC system, occupancy, building characteristics, etc. Some of this data may be supplied by the individual users of the system,

while other data may come from third-party sources such as the electric and other utilities who supply energy to those users.

[0022] Combining these data sources will also allow the server to calculate the effective thermal mass of the structures conditioned by those thermostats. By combining data from multiple thermostats in a given neighborhood, the system can correct for flaws in the location of a given thermostat, and can evaluate the efficiency of a given system, as well as assist in the diagnosis of problems and malfunctions in such systems.

[0023] This and other advantages of certain embodiments of the invention are explained in the detailed description and claims that make reference to the accompanying diagrams and flowcharts.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Figure 1 shows an example of an overall environment in which an embodiment of the invention may be used.

[0025] Figure 2 shows a high-level illustration of the architecture of a network showing the relationship between the major elements of one embodiment of the subject invention.

[0026] Figure 3 shows an embodiment of the website to be used as part of the subject invention.

[0027] Figure 4 shows a high-level schematic of the thermostat used as part of the subject invention.

[0028] Figure 5 shows one embodiment of the database structure used as part of the subject invention.

[0029] Figures 6a and 6b show graphical representations of inside and outside temperatures in two different homes, one with high thermal mass and one with low thermal mass.

[0030] Figures 7a and 7b show graphical representations of inside and outside temperatures in the same homes as in Figures 6a and 6b, showing the cycling of the air conditioning systems in those houses.

[0031] Figures 8a and 8b show graphical representations of inside and outside temperatures in the same home as in Figures 6a and 7a, showing the cycling of the air conditioning on two different days in order to demonstrate the effect of a change in operating efficiency on the parameters measured by the thermostat.

[0032] Figures 9a and 9b show the effects of employing a pre-cooling strategy in two different houses.

[0033] Figures 10a and 10b show graphical representations of inside and outside temperatures in two different homes in order to demonstrate how the system can correct for erroneous readings in one house by referencing readings in another.

[0034] Figure 11 is a flowchart illustrating the steps involved in calculating the effective thermal mass of a home using the subject invention.

[0035] Figure 12 is a flowchart illustrating the steps involved in determining whether an HVAC system has developed a problem that impairs efficiency using the subject invention.

[0036] Figure 13 is a flowchart illustrating the steps involved in correcting for erroneous readings in one house by referencing readings in another using the subject invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0037] **Figure 1** shows an example of an overall environment 100 in which an embodiment of the invention may be used. The environment 100 includes an interactive communication network 102 with computers 104 connected thereto. Also connected to network 102 are one or more server computers 106, which store information and make the information available to computers 104. The network 102 allows communication between and among the computers 104 and 106.

[0038] Presently preferred network 102 comprises a collection of interconnected public and/or private networks that are linked to together by a set of standard protocols to form a distributed network. While network 102 is intended to refer to what is now commonly referred to as the Internet, it is also intended to encompass variations which may be made in the future, including changes additions to existing standard protocols.

[0039] When a user of the subject invention wishes to access information on network 102, the buyer initiates connection from his computer 104. For example, the user invokes a browser, which executes on computer 104. The browser, in turn, establishes a communication link with network 102. Once connected to network 102, the user can direct the browser to access information on server 106.

[0040] One popular part of the Internet is the World Wide Web. The World Wide Web contains a large number of computers 104 and servers 106, which store HyperText Markup Language (HTML) documents capable of displaying graphical and textual information. HTML is a standard coding convention and set of codes for attaching presentation and linking attributes to informational content within documents.

[0041] The servers 106 that provide offerings on the World Wide Web are typically called websites. A website is often defined by an Internet address that has an associated electronic page. Generally, an electronic page is a document that organizes the presentation of text graphical images, audio and video.

[0042] In addition to the Internet, the network 102 can comprise a wide variety of interactive communication media. For example, network 102 can include local area networks, interactive television networks, telephone networks, wireless data systems, two-way cable systems, and the like.

[0043] In one embodiment, computers 104 and servers 106 are conventional computers that are equipped with communications hardware such as modem or a network interface card. The computers include processors such as those sold by Intel and AMO. Other processors may also be used, including general-purpose processors, multi-chip processors, embedded processors and the like.

[0044] Computers 104 can also be handheld and wireless devices such as personal digital assistants (PDAs), cellular telephones and other devices capable of accessing the network.

[0045] Computers 104 utilize a browser configured to interact with the World Wide Web. Such browsers may include Microsoft Explorer, Mozilla, Firefox, Opera or Safari. They may also include browsers used on handheld and wireless devices.

[0046] The storage medium may comprise any method of storing information. It may comprise random access memory (RAM), electronically erasable programmable read only memory (EEPROM), read only memory (ROM), hard disk, floppy disk, CD-ROM, optical memory, or other method of storing data.

[0047] Computers 104 and 106 may use an operating system such as Microsoft Windows, Apple Mac OS, Linux, Unix or the like.

[0048] Computers 106 may include a range of devices that provide information, sound, graphics and text, and may use a variety of operating systems and software optimized for distribution of content via networks.

[0049] **Figure 2** illustrates in further detail the architecture of the specific components connected to network 102 showing the relationship between the major elements of one embodiment of the subject invention. Attached to the network are thermostats 108 and computers 104 of various users. Connected to thermostats 108 are HVAC units 110. The HVAC units may be conventional air conditioners, heat pumps, or other devices for transferring heat into or out of a building. Each user is connected to the server 106 via wired or wireless connection such as Ethernet or a wireless protocol

such as IEEE 802.11, a gateway 110 that connects the computer and thermostat to the Internet via a broadband connection such as a digital subscriber line (DSL) or other form of broadband connection to the World Wide Web. Server 106 contains the content to be served as web pages and viewed by computers 104, as well as databases containing information used by the servers.

[0050] In the currently preferred embodiment, the website 200 includes a number of components accessible to the user, as shown in **Figure 3**. Those components may include a means to enter temperature settings 202, a means to enter information about the user's home 204, a means to enter the user's electricity bills 206, means to calculate energy savings that could result from various thermostat-setting strategies 208, and means to enable and choose between various arrangements 210 for demand reduction with their electric utility provider as intermediated by the demand reduction service provider.

[0051] **Figure 4** shows a high-level block diagram of thermostat 108 used as part of the subject invention. Thermostat 108 includes temperature sensing means 252, which may be a thermistor, thermal diode or other means commonly used in the design of electronic thermostats. It includes a microprocessor 254, memory 256, a display 258, a power source 260, a relay 262, which turns the HVAC system on and off in response to a signal from the microprocessor, and contacts by which the relay is connected to the wires that lead to the HVAC system. To allow the thermostat to communicate bi-directionally with the computer network, the thermostat also includes means 264 to connect the thermostat to a local computer or to a wireless network. Such means could be in the form of Ethernet, wireless protocols such as IEEE 802.11, IEEE 802.15.4, Bluetooth, cellular systems such as CDMA, GSM and GPRS, or other wireless protocols. The thermostat 250 may also include controls 266 allowing users to change settings directly at the thermostat, but such controls are not necessary to allow the thermostat to function.

[0052] The data used to generate the content delivered in the form of the website is stored on one or more servers 106 within one or more databases. As shown in **Figure 5**, the overall database structure 300 may include temperature database 400, thermostat settings database 500, energy bill database 600, HVAC hardware database 700, weather database 800, user database 900, transaction database 1000, product and service database 1100 and such other databases as may be needed to support these and additional features.

[0053] The website will allow users of connected thermostats 250 to create personal accounts. Each user's account will store information in database 900, which tracks various attributes relative to users of the site. Such attributes may include the make and model of the specific HVAC equipment in the user's home; the age and square footage of the home, the solar orientation of the home, the location of the thermostat in the home, the user's preferred temperature settings, whether the user is a participant in a demand reduction program, etc.

[0054] As shown in Figure 3, the website 200 will permit thermostat users to perform through the web browser substantially all of the programming functions traditionally performed directly at the physical thermostat, such as temperature set points, the time at which the thermostat should be at each set point, etc. Preferably the website will also allow users to accomplish more advanced tasks such as allow users to program in vacation settings for times when the HVAC system may be turned off or run at more economical settings, and set macros that will allow changing the settings of the temperature for all periods with a single gesture such as a mouse click.

[0055] In addition to using the system to allow better signaling and control of the HVAC system, which relies primarily on communication running from the server to the thermostat, the bi-directional communication will also allow the thermostat 108 to regularly measure and send to the server information about the temperature in the building. By comparing outside temperature, inside temperature, thermostat settings, cycling behavior of the HVAC system, and other variables, the system will be capable of numerous diagnostic and controlling functions beyond those of a standard thermostat.

[0056] For example, **Figure 6a** shows a graph of inside temperature and outside temperature for a 24-hour period in House A, assuming no HVAC activity. House A has double-glazed windows and is well-insulated. When outside temperature 302 increases, inside temperature 304 follows, but with significant delay because of the thermal mass of the building.

[0057] **Figure 6b** shows a graph of inside temperature and outside temperature for the same 24-hour period in House B. House B is identical to House A except that it (i) is located a block away and (ii) has single-glazed windows and is poorly insulated. Because the two houses are so close to each other, outside temperature 302 is the same in Figure 6a and Figure 6b. But the lower thermal mass of House B means that the rate at which the inside temperature 306 changes in response to the changes in outside temperature is much greater.

[0058] The differences in thermal mass will affect the cycling behavior of the HVAC systems in the two houses as well. **Figure 7a** shows a graph of inside temperature and outside temperature in House A for the same 24-hour period as shown in Figure 6a, but assuming that the air conditioning is being used to try to maintain an internal temperature of 70 degrees. Outside temperatures 302 are the same as in Figures 6a and 6b. Because of the high thermal mass of the house, the air conditioning does not need to run for very long to maintain the target temperature, as shown by shaded areas 310.

[0059] **Figure 7b** shows a graph of inside temperature 312 and outside temperature 302 for the same 24-hour period in House B, assuming use of the air conditioning as in Figure 7a. Because of the lower thermal mass of House B, the air conditioning system in House B has to run longer in order to maintain the same target temperature, as shown by shaded areas 314.

[0060] Because server 106a logs the temperature readings from inside each house (whether once per minute or over some other interval), as well as the timing and duration of air conditioning cycles, database 300 will contain a history of the thermal performance of each house. That performance data will allow the server 106a to calculate an effective thermal mass for each such structure - that is, the speed with the temperature inside a given building will change in response to changes in outside temperature and differences between inside and outside temperatures. Because the server will also log these inputs against other inputs including time of day, humidity, etc., the server will be able to predict, at any given time on any given day, the rate at which inside temperature should change for given inside and outside temperatures.

[0061] The server will also record the responses of each house to changes in outside conditions and cycling behavior over time. That will allow the server to diagnose problems as and when they develop. For example, **Figure 8a** shows a graph of outside temperature 402, inside temperature 404 and HVAC cycle times 406 in House A for a specific 24-hour period on date X. Assume that, based upon comparison of the performance of House A on date X relative to House A's historical performance, and in comparison to the performance of House A relative to other nearby houses on date X, the HVAC system in House A is presumed to be operating at normal efficiency, and that House A is in the 86th percentile as compared to those other houses. **Figure 8b** shows a graph of outside temperature 408, inside temperature 410 and HVAC cycle times 412 in House A for the 24-hour period on date X + 1. House A's HVAC system now requires significantly longer cycle times in order to try to maintain the same internal temperature. If those longer cycle times were due to higher outside temperatures, those cycle times would not indicate the existence of any problems. But because server 106 is aware of the

outside temperature, the system can eliminate that possibility as an explanation for the higher cycle times. Because server 106 is aware of the cycle times in nearby houses, it can determine that, for example, on date X + 1 the efficiency of House A is only in the 23rd percentile. The server will be programmed with a series of heuristics, gathered from predictive models and past experience, correlating the drop in efficiency and the time interval over which it has occurred with different possible causes. For example, a 50% drop in efficiency in one day may be correlated with a refrigerant leak, especially if followed by a further drop in efficiency on the following day. A reduction of 10% over three months may be correlated with a clogged filter. Based upon the historical data recorded by the server, the server 106 will be able to alert the homeowner that there is a problem and suggest a possible cause.

[0062] Because the system will be able to calculate effective thermal mass, it will be able to determine the cost effectiveness of strategies such as pre-cooling for specific houses under different conditions.

Figure 9a shows a graph of outside temperature 502, inside temperature 504 and HVAC cycling times 506 in House A for a specific 24-hour period on date Y assuming that the system has used a pre-cooling strategy to avoid running the air conditioning during the afternoon, when rates are highest. Because House A has high thermal mass, the house is capable of "banking" cool, and energy consumed during off-peak hours is in effect stored, allowing the house to remain cool even when the system is turned off. Temperatures keep rising during the period the air conditioning is off, but because thermal mass is high, the rate of increase is low, and the house is still comfortable six hours later. Although the pre-cooling cycle time is relatively long, the homeowner may still benefit because the price per kilowatt during the morning pre-cooling phase is lower than the price during the peak load period. **Figure 9b** shows a graph of the same outside temperature 502 in House B as in House A in **Figure 9a** for the same 24-hour period and using the same pre-cooling strategy as shown by cycling times 506. But because House B has minimal thermal mass, using additional electricity in order to pre-cool the house does not have the desired effect; inside temperature 508 warms up so fast that the cool that had been banked is quickly lost. Thus the system will recommend that House A pre-cool in order to save money, but not recommend pre-cooling for House B.

[0063] The system can also help compensate for anomalies such as measurement inaccuracies due to factors such as poor thermostat location. It is well-known that thermostats should be placed in a location that will be likely to experience "average" temperatures for the overall structure, and should be isolated from windows and other influences that could bias the temperatures they "see." But for various reasons, not all thermostat installations are that ideal. **Figure 10a** shows a graph of outside

temperature 602, the average inside temperature for the entire house 604, and inside temperature as read by the thermostat 606 in House C for a specific 24-hour period on September 15th, assuming that the thermostat is located so that from 4PM until 5:30PM on that day the thermostat is in direct sunlight. Until the point at which the sun hits the thermostat, the average inside temperature and temperature as read by the thermostat track very closely. But when the direct sunlight hits the thermostat, the thermostat and the surrounding area can heat up, causing the internal temperature as read by the thermostat to diverge significantly from the average temperature for the rest of the house. Conventional thermostats have no way of distinguishing this circumstance from a genuinely hot day, and will both over-cool the rest of the house and waste considerable energy when it cycles the air conditioner in order to reduce the temperature as sensed by the thermostat. If the air conditioning is turned off, this phenomenon will manifest as a spike in temperature as measured by the thermostat. If the air conditioning is turned on (and has sufficient capacity to respond to the distorted temperature signal caused by the sunlight), this phenomenon will likely manifest as relatively small changes in the temperature as sensed by the thermostat, but significantly increased HVAC usage (as well as excessively lowered temperatures in the rest of the house, but this result may not be directly measured in a single sensor environment. The subject system, in contrast, has multiple mechanisms that will allow it to correct for such distortions. First, because the subject system compares the internal readings from House C with the external temperature, it will be obvious that the rise in temperature at 4:00PM is not correlated with a corresponding change in outside temperature. Second, because the system is also monitoring the readings from the thermostat in nearby House D, which (as shown in Figure 10b) is exposed to the same outside temperature 602, but has no sudden rise in measured internal temperature 608 at 4:00, the system has further validation that the temperature increase is not caused by climatic conditions. And finally, because the system has monitored and recorded the temperature readings from the thermostat in House C for each previous day, and has compared the changing times of the aberration with the progression of the sun, the system can distinguish the patterns likely to indicate solar overheating from other potential causes.

[0064] Figure 11 illustrates the steps involved in calculating comparative thermal mass, or the thermal mass index. In step 1102, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step 1104, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat

in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1106, the server retrieves data regarding recent temperature readings as recorded by the thermostat in home X. In step 1108, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1110, the server retrieves the current inside temperature reading as transmitted by the thermostat. In step 1112, the server calculates the thermal mass index for the home under those conditions; that is, for example, it calculates the likely rate of change for internal temperature in home X from a starting point of 70 degrees when the outside temperature is 85 degrees at 3:00PM on August 10th when the wind is blowing at 5 mph from the north and the sky is cloudy. The server accomplishes this by applying a basic algorithm that weighs each of these external variables as well as variables for various characteristics of the home itself (such as size, level of insulation, method of construction, etc.) and data from other houses and environments.

[0065] Figure 12 illustrates the steps involved in diagnosing defects in the HVAC system for specific home X. In step 1202, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step 1204, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1206, the server retrieves data regarding current and recent temperature readings as recorded by the thermostat in home X. In step 1208, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1210, the server retrieves comparative data from other houses that have thermostats that also report to the server. Such data may include interior temperature readings, outside temperature for those specific locations, duty cycle data for the HVAC systems at those locations, profile data for the structures and HVAC systems in those houses and the calculated thermal mass index for those other houses. In step 1212, the server calculates the current relative efficiency of home X as compared to other homes. Those comparisons will take into account differences in size, location, age, etc., in making those comparisons.

[0066] The server will also take into account that relative efficiency is not absolute, but will vary depending on conditions. For example, a house that has extensive south-facing windows is likely to experience significant solar gain. On sunny winter days, that home will appear more efficient than on cloudy winter days. That same house will appear more efficient at times of day and year when trees or overhangs shade those windows than it will when summer sun reaches those windows. Thus the server will calculate efficiency under varying conditions.

[0067] In step 1214, the server compares the HVAC system's efficiency, corrected for the relevant conditions, to its efficiency in the past. If the current efficiency is substantially the same as the historical efficiency, the server concludes, in step 1216, that there is no defect and the diagnostic routine ends. If the efficiency has changed, the server proceeds to compare the historical and current data against patterns of changes known to indicate specific problems. For example, in step 1218, the server compares that pattern of efficiency changes against the known pattern for a clogged air filter, which is likely to show a slow, gradual degradation over a period of weeks or even months. If the pattern of degradation matches the clogged filter paradigm, the server creates and transmits to the homeowner a message, in step 1220, alerting the homeowner to the possible problem. If the problem does not match the clogged filter paradigm, the system compares, in step 1222, the pattern to the known pattern for a refrigerant leak, which is likely to show a degradation over a period of a few hours to a few days. If the pattern of degradation matches the refrigerant leak paradigm, the server creates and transmits to the homeowner a message, in step 1224, alerting the homeowner to the possible problem. If the problem does not match the refrigerant leak paradigm, the system compares, in step 1226, the pattern to the known pattern for an open window or door, which is likely to show significant changes for relatively short periods at intervals uncorrelated with climatic patterns. If the pattern of degradation matches the open door/window paradigm, the server creates and transmits to the homeowner a message, in step 1228, alerting the homeowner to the possible problem. If the problem does not match the refrigerant leak paradigm, the system continues to step through remaining known patterns N, in step 1230, until either a pattern is matched and reported in step 1232, or the list has been exhausted without a match, and an unknown problem is reported in step 1234.

[0068] **Figure 13** illustrates the steps involved in diagnosing inaccurate thermostat readings due to improper location. In step 1302, the server retrieves climate data related to home X. Such data may include current outside temperature, outside temperature during the preceding hours, outside humidity, wind direction and speed, whether the sun is obscured by clouds, and other factors. In step

1304, the server retrieves HVAC duty cycle data for home X. Such data may include target settings set by the thermostat in current and previous periods, the timing of switch-on and switch-off events and other data. In step 1306, the server retrieves data regarding current and recent temperature readings as recorded by the thermostat in home X. In step 1308, the server retrieves profile data for home X. Such data may include square footage and number of floors, when the house was built and/or renovated, the extent to which it is insulated, its address, make, model and age of its furnace and air conditioning hardware, and other data. In step 1310, the server retrieves comparative data from other houses that have thermostats that also report to the server. Such data may include interior temperature readings, outside temperature for those specific locations, duty cycle data for the HVAC systems at those locations, profile data for the structures and HVAC systems in those houses and the calculated thermal mass index for those other houses. In step 1312, the server calculates the expected thermostat temperature reading based upon the input data. In step 1314, the server compares the predicted and actual values. If the calculated and actual values are at least roughly equivalent, the server concludes, in step 1316, that there is no thermostat-related anomaly. If the calculated and actual values are not roughly equivalent, the server retrieves additional historical information about past thermostat readings in step 1318. In step 1320, the server retrieves solar progression data, i.e., information regarding the times at which the sun rises and sets on the days being evaluated at the location of the house being evaluated, and the angle of the sun at that latitude, etc. In step 1322, the server compares the characteristics of the anomalies over time, to see if, for example, abnormally high readings began at 3:06 on June 5th, 3:09 on June 6th, 3:12 on June 7th, and the solar progression data suggests that at the house being analyzed, that sun would be likely to reach a given place in that house three minutes later on each of those days. If the thermostat readings do not correlate with the solar progression data, the server concludes, in step 1324, that the sun is not causing the distortion by directly hitting the thermostat. If the thermostat readings do correlate with solar progression, the server then calculates, in step 1326, the predicted duration of the distortion caused by the sun. In step 1328, the server calculates the appropriate setpoint information to be used by the thermostat to maintain the desired temperature and correct for the distortion for the expected length of the event. For example, if the uncorrected setpoint during the predicted event is 72 degrees, and the sun is expected to elevate the temperature reading by eight degrees, the server will instruct the thermostat to maintain a setpoint of 80 degrees. In step 1330, the server sends the homeowner a message describing the problem.

[0069] The system installed in a subscriber's home may optionally include additional temperature sensors at different locations within the building. These additional sensors may be connected to the rest of the system via a wireless system such as 802.11 or 802.15.4, or may be connected via wires. Additional temperature and/or humidity sensors may allow increased accuracy of the system, which can in turn increase user comfort or energy savings.

[0070] While particular embodiments have been shown and described, it is apparent that changes and modifications may be made without departing from the invention in its broader aspects and, therefore, the invention may be carried out in other ways without departing from the true spirit and scope. These and other equivalents are intended to be covered by the following claims:

WHAT IS CLAIMED IS:

1. A system for controlling an HVAC system at a user's building, the system comprising:

a memory; and

one or more processors,

the one or more processors being configured to receive a first data from at least one sensor, wherein the first data from the at least one sensor includes a measurement of at least one characteristic of the user's building;

the one or more processors being further configured to receive a second data from a network connection, wherein the second data from the network connection is collected from a source external to the building;

the one or more processors being further configured to receive a first temperature setpoint for the building, wherein the first temperature setpoint includes a temperature value and a time value;

the one or more processors being further configured to predict, based at least on the first data from the sensor, the second data from the network connection, and the first temperature setpoint, the time necessary for the HVAC system to operate in order to reach the temperature value by the time value; and

the one or more processors being further configured to control the HVAC system to operate to cause the building to reach the temperature value by the time value.

ABSTRACT OF THE DISCLOSURE

The invention comprises systems and methods for evaluating changes in the operational efficiency of an HVAC system over time. The climate control system obtains temperature measurements from at least a first location conditioned by the climate system, and status of said HVAC system. One or more processors receives measurements of outside temperatures from at least one source other than said HVAC system and compares said temperature measurements from said first location with expected temperature measurements. The expected temperature measurements are based at least in part upon past temperature measurements.

Electronic Patent Application Fee Transmittal

Application Number:

Filing Date:

Title of Invention:

SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM

First Named Inventor/Applicant Name:

John Douglas STEINBERG

Filer:

Daniel Albert Tanner

Attorney Docket Number:

230-002-CON

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800

Pages:

Claims:

Miscellaneous-Filing:

Petition:

Patent-Appeals-and-Interference:

070

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1820

Electronic Acknowledgement Receipt

EFS ID:	45281992
Application Number:	17700409
International Application Number:	
Confirmation Number:	5915
Title of Invention:	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM
First Named Inventor/Applicant Name:	John Douglas STEINBERG
Customer Number:	144465
Filer:	Daniel Albert Tanner
Filer Authorized By:	
Attorney Docket Number:	230-002-CON
Receipt Date:	21-MAR-2022
Filing Date:	
Time Stamp:	21:47:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1820
RAM confirmation Number	E20223KL47524806
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Drawings-only black and white line drawings	DrawingsForFiling.pdf	6202664	no	13
			757fe41 de01 a428576e6b97d183848aff02e4d7c		
Warnings:					
Information:					
2	Application Data Sheet	ADSForFiling.pdf	1877114	no	9
			263270ec326df37b3753b46086fb9f66254b40fe		
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Oath or Declaration filed	DecForFiling.pdf	3082624	no	2
			b9eead974aef0dab24a056c900d7230ed378afa		
Warnings:					
Information:					
4	Power of Attorney	StatementUnder373ForFiling.pdf	2284884	no	3
			e1536cce226e97c3a197f87e29ec8f0c3f6c8ca7		
Warnings:					
Information:					
5	Power of Attorney	POAForFiling.pdf	820471	no	2
			711afbff2cd802e7f3c0c1fb19516004e8bca6db		
Warnings:					
Information:					
6	Transmittal of New Application	ApplicationTransForFiling.pdf	1180018	no	2
			01c1dd12220d7133a563234b43fdd1d94875feab		
Warnings:					

Information:					
7		FinalAppForFiling.pdf	183107	yes	20
			15dbd5536faa189f39d90203f3a11a73d6127dfc		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	18	
	Claims		19	19	
	Abstract		20	20	
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	43819	no	2
			1f7c34fdded45b03d73de0f976d9978d4e6a36cae		
Warnings:					
Information:					
Total Files Size (in bytes):			15674701		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

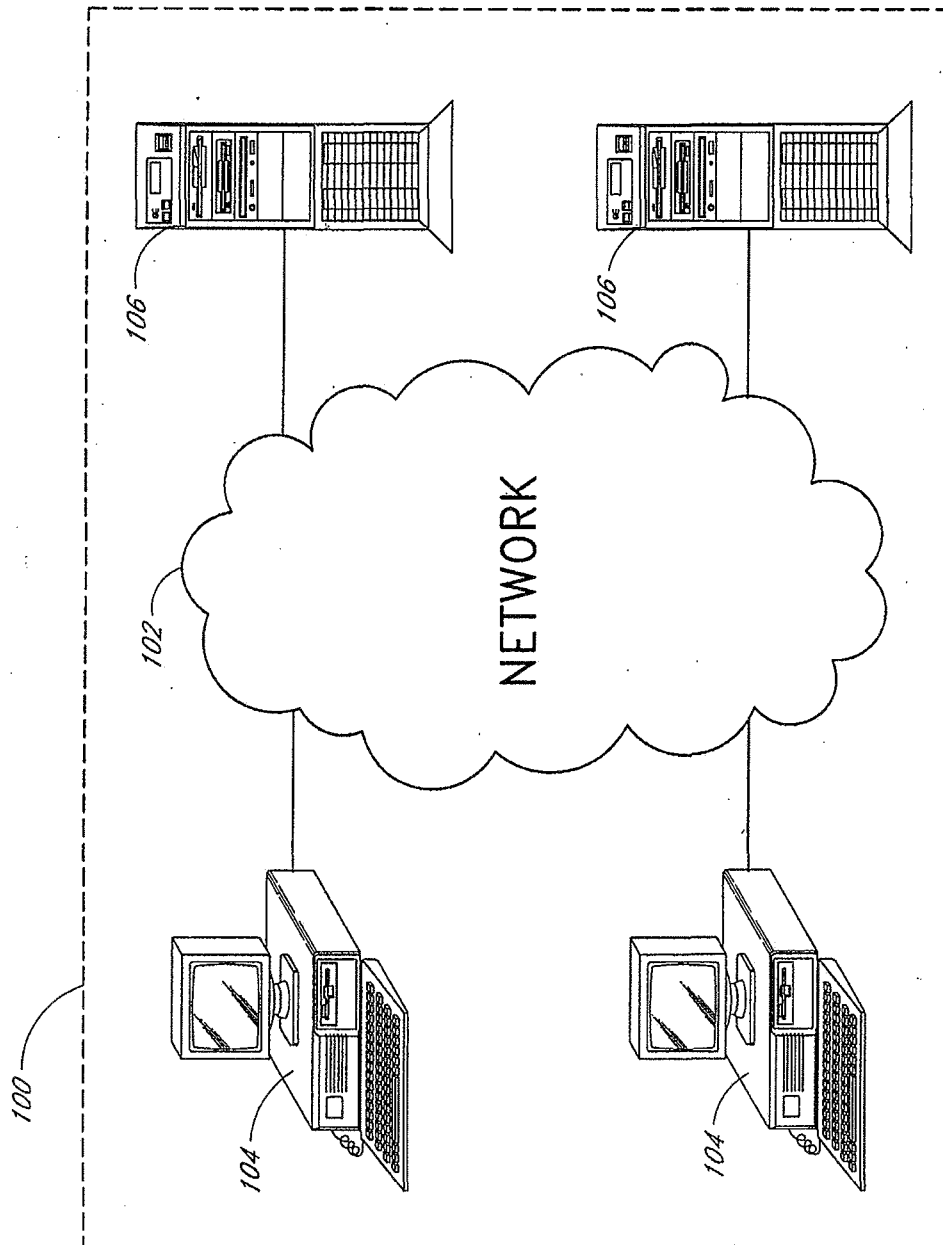
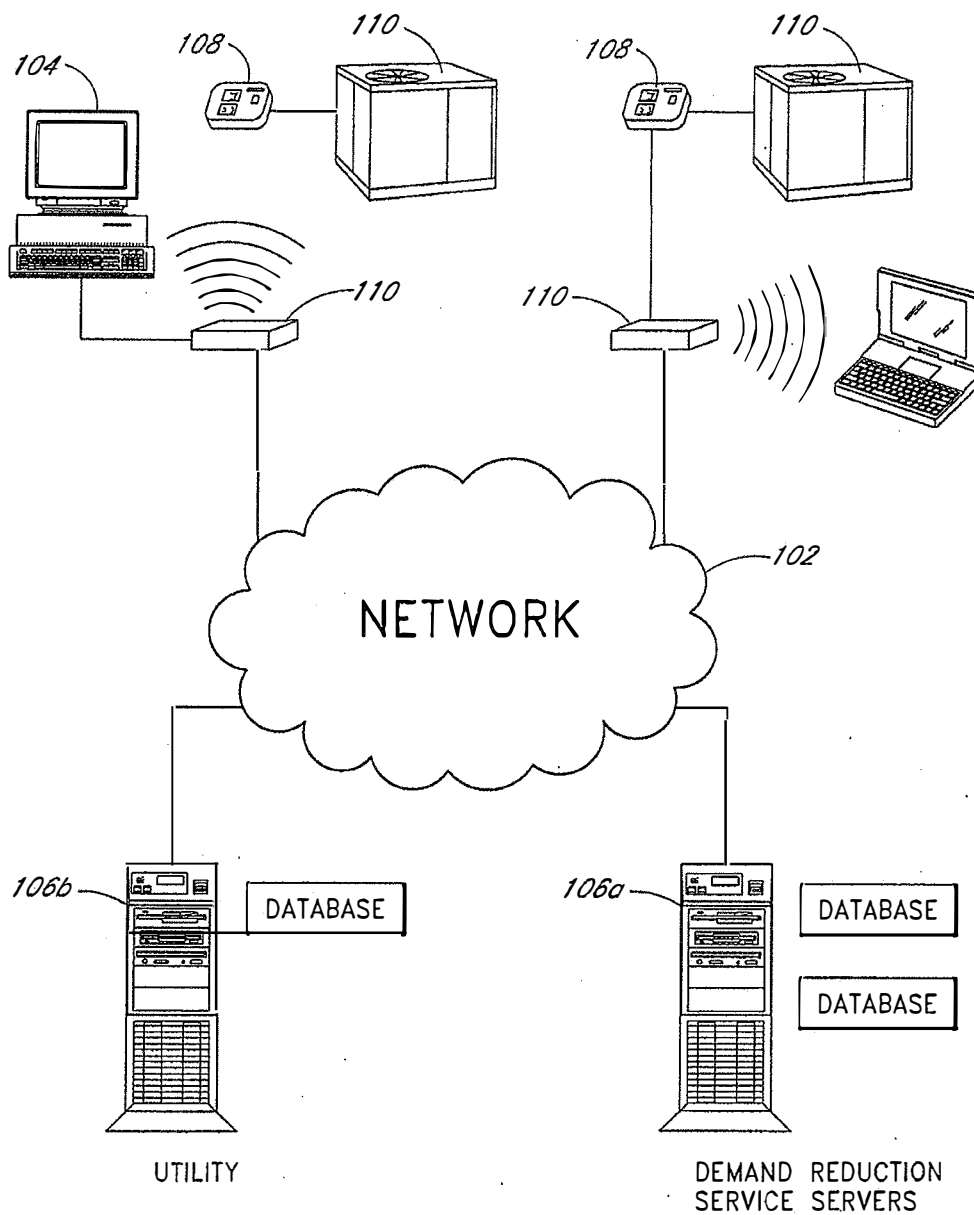


FIG. 1

*FIG. 2*

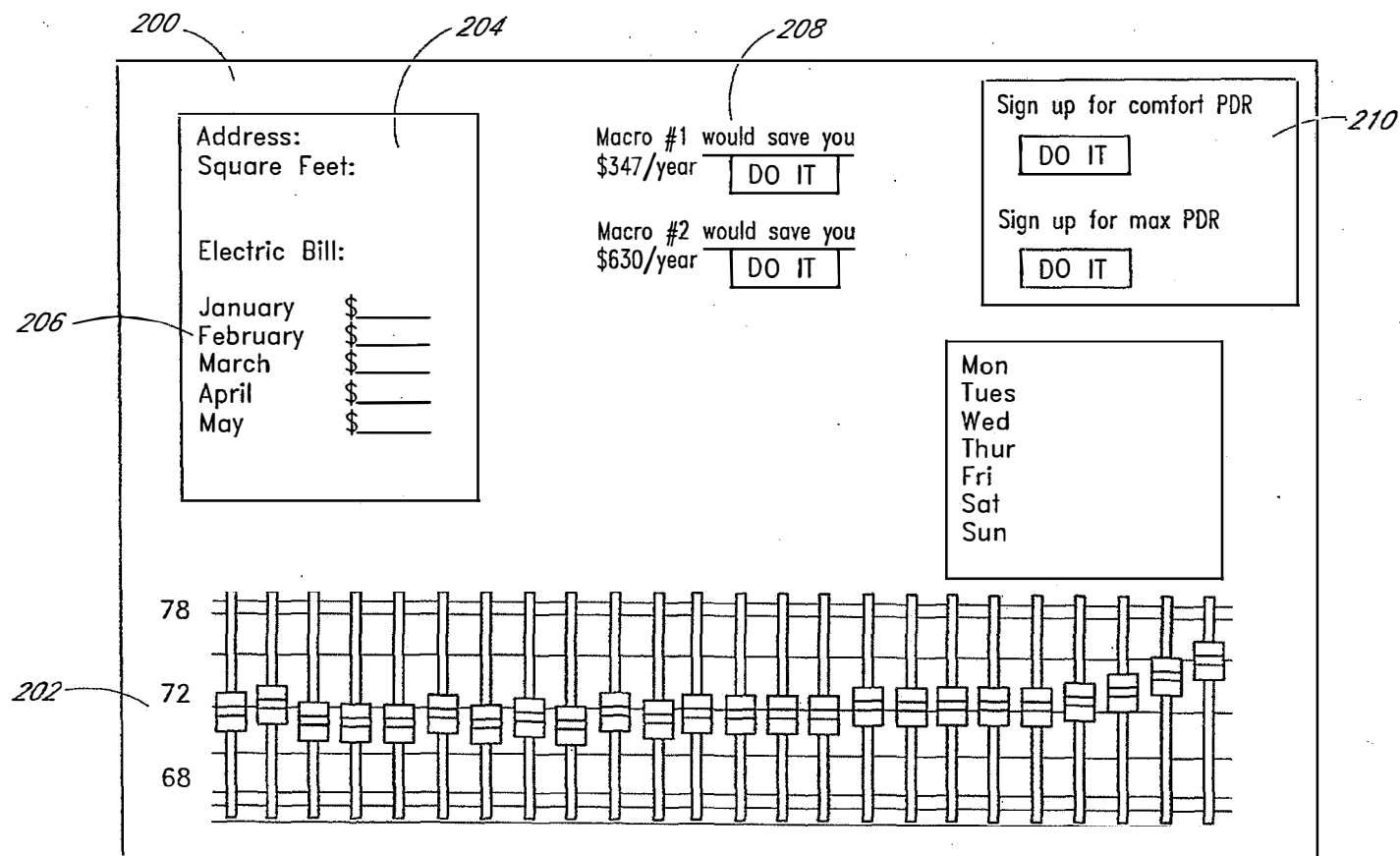


FIG. 3

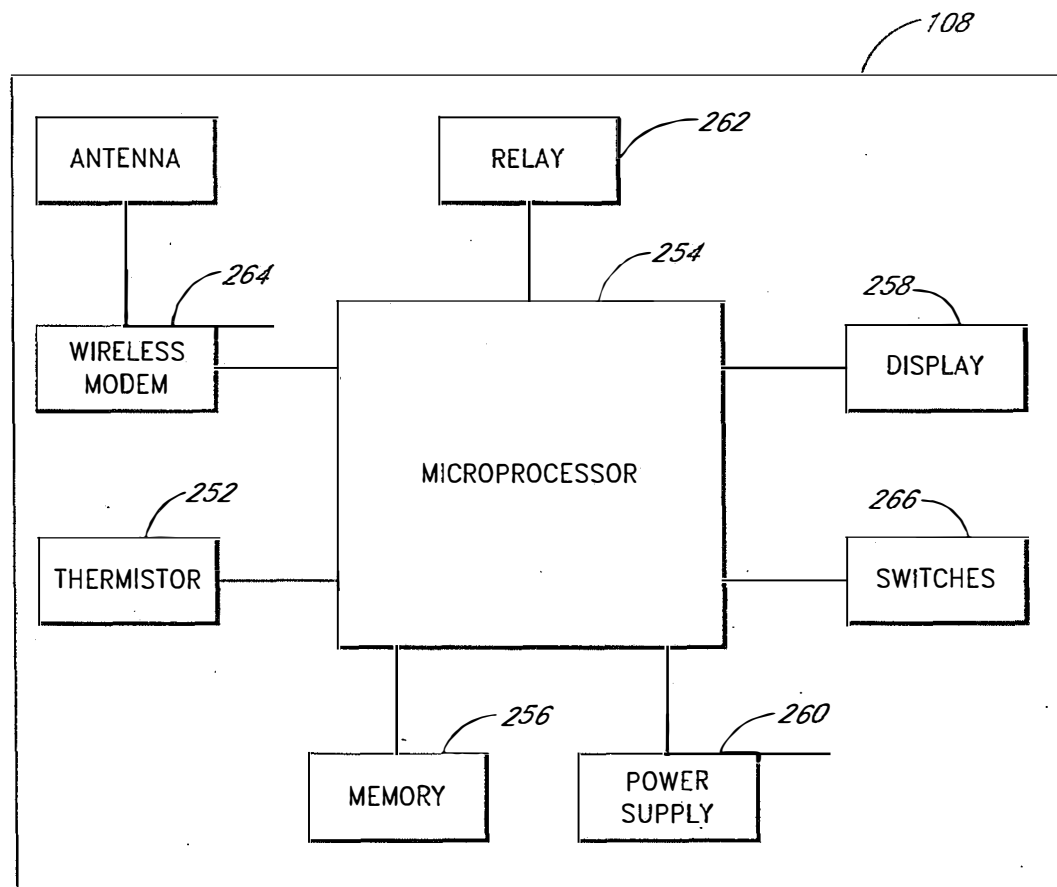


FIG. 4

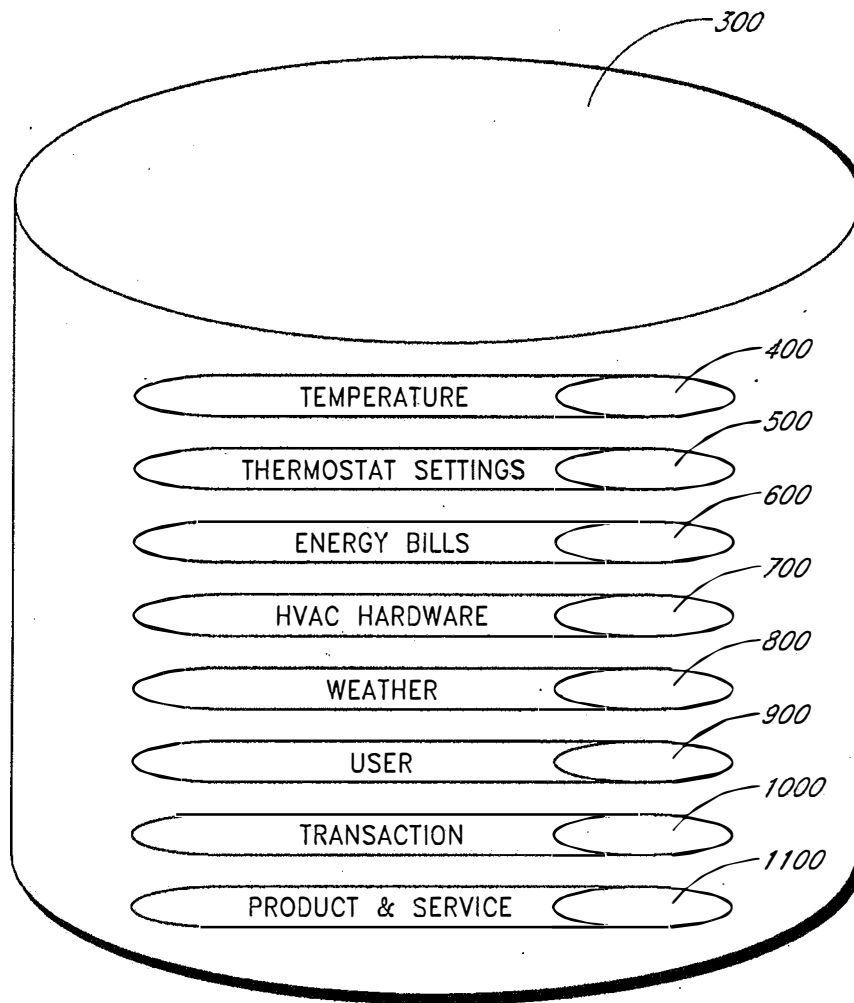


FIG. 5

6/13

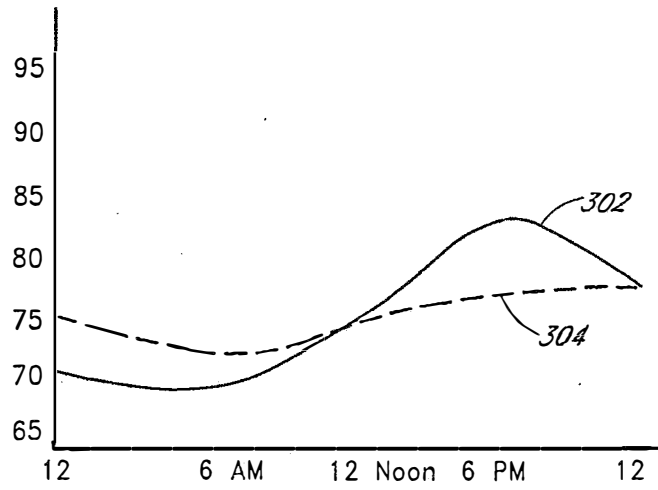


FIG. 6A

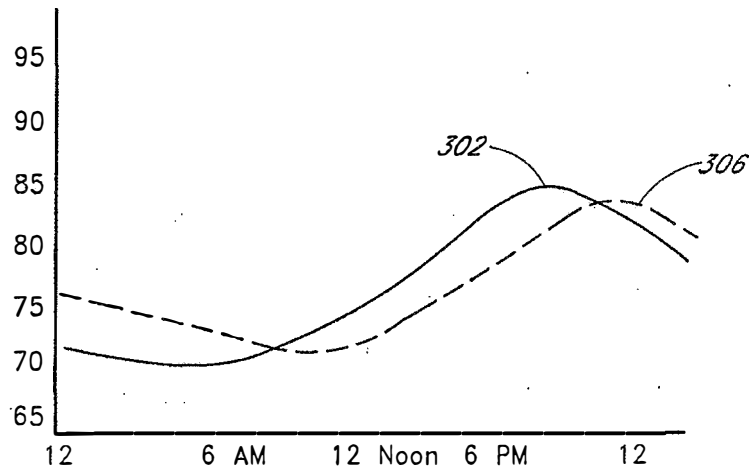


FIG. 6B

7/13

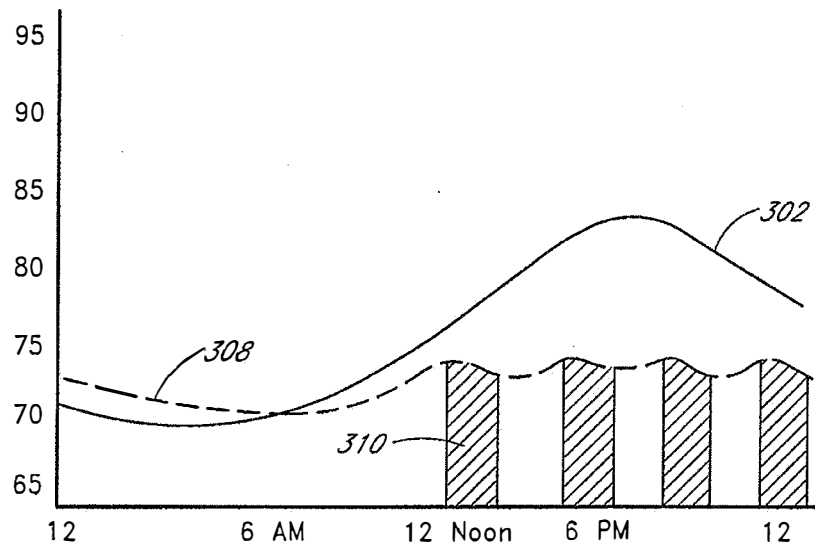


FIG. 7A

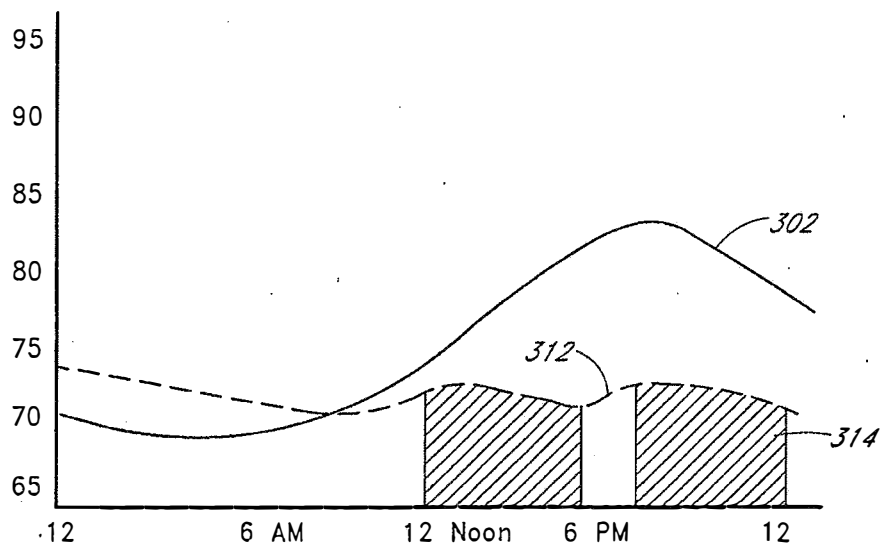


FIG. 7B

8/13

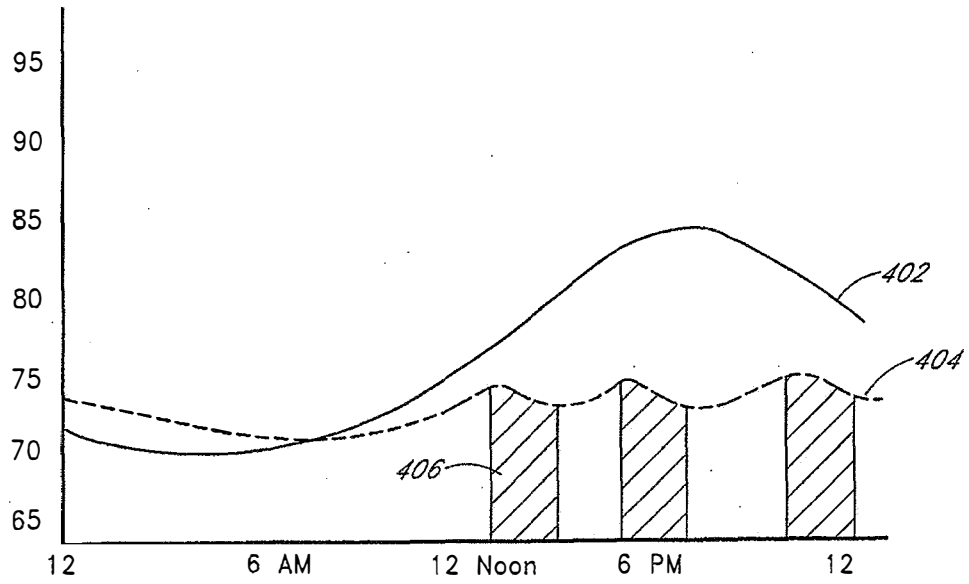


FIG. 8A

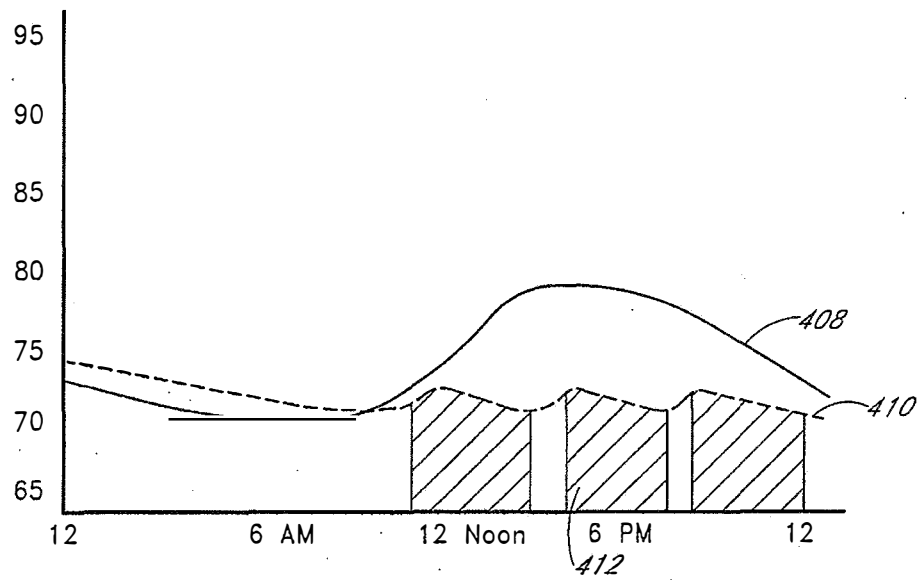


FIG. 8B

9/13

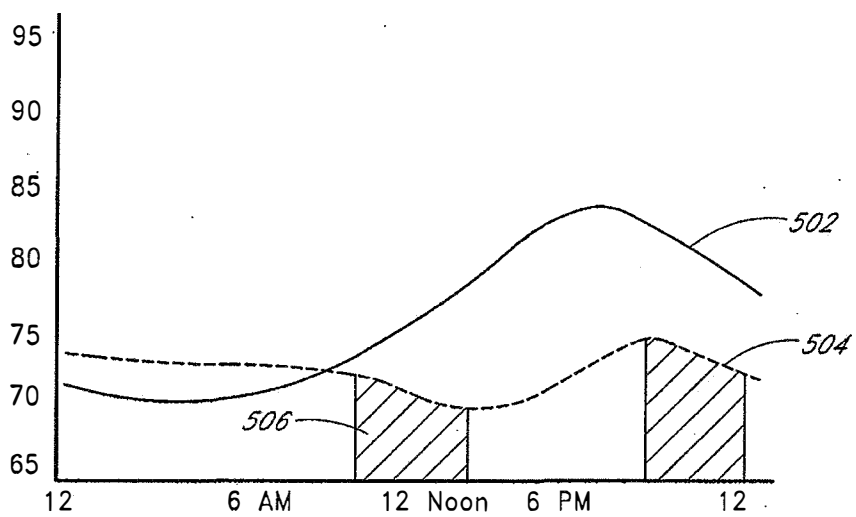


FIG. 9A

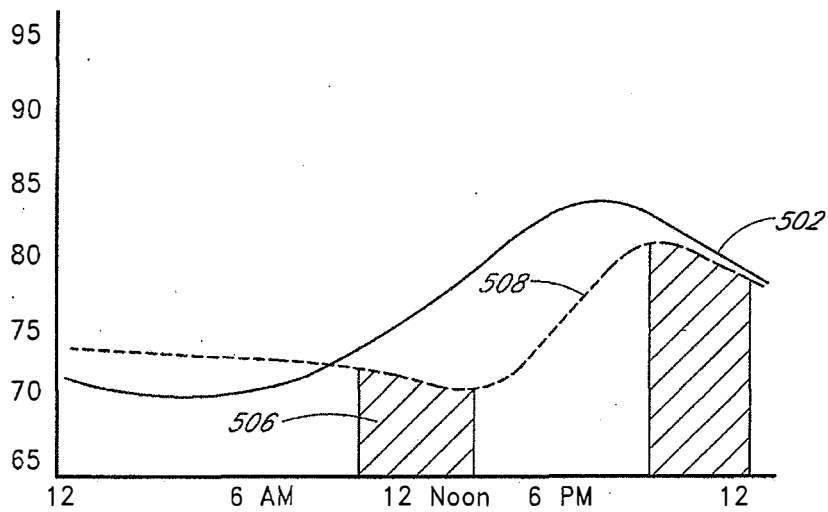


FIG. 9B

10/13

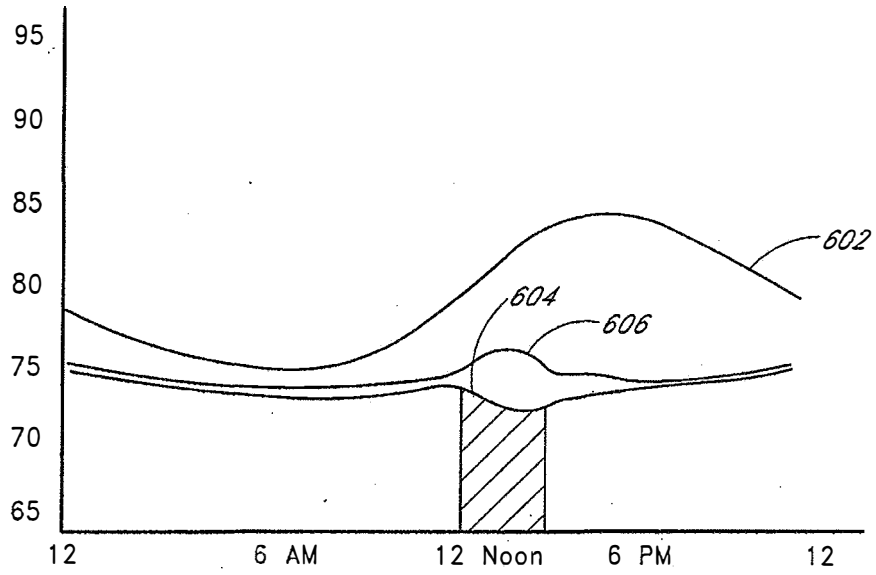


FIG. 10A

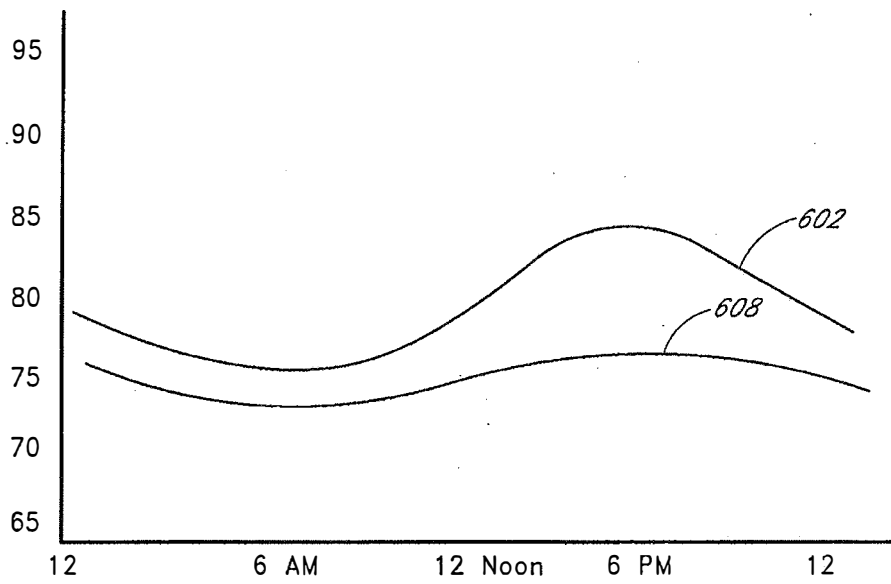
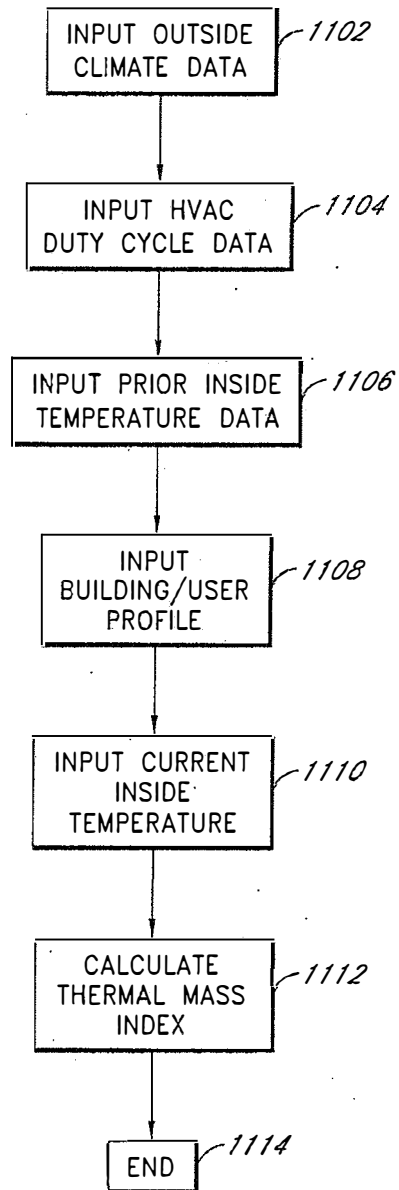


FIG. 10B

*FIG. 11*

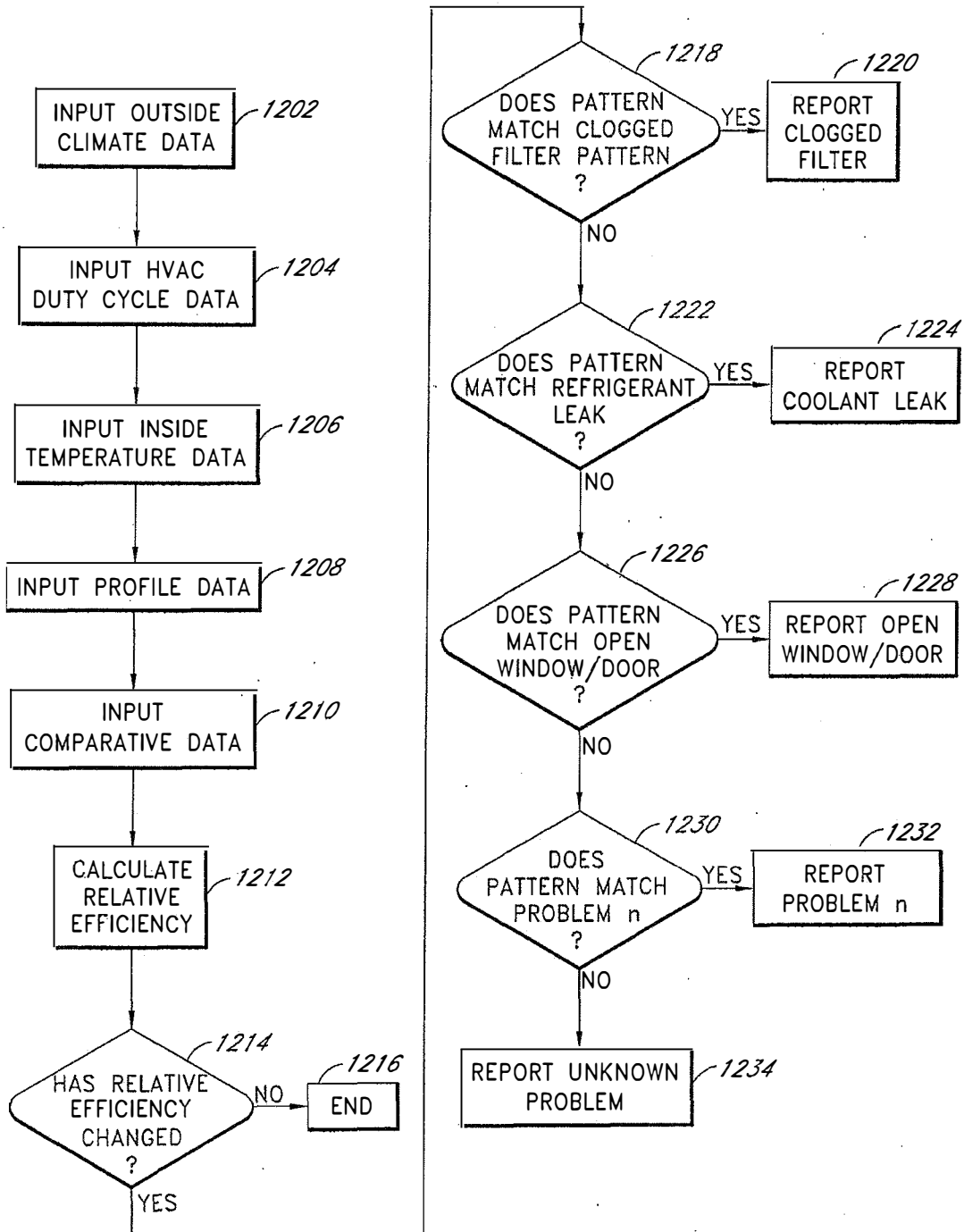


FIG. 12

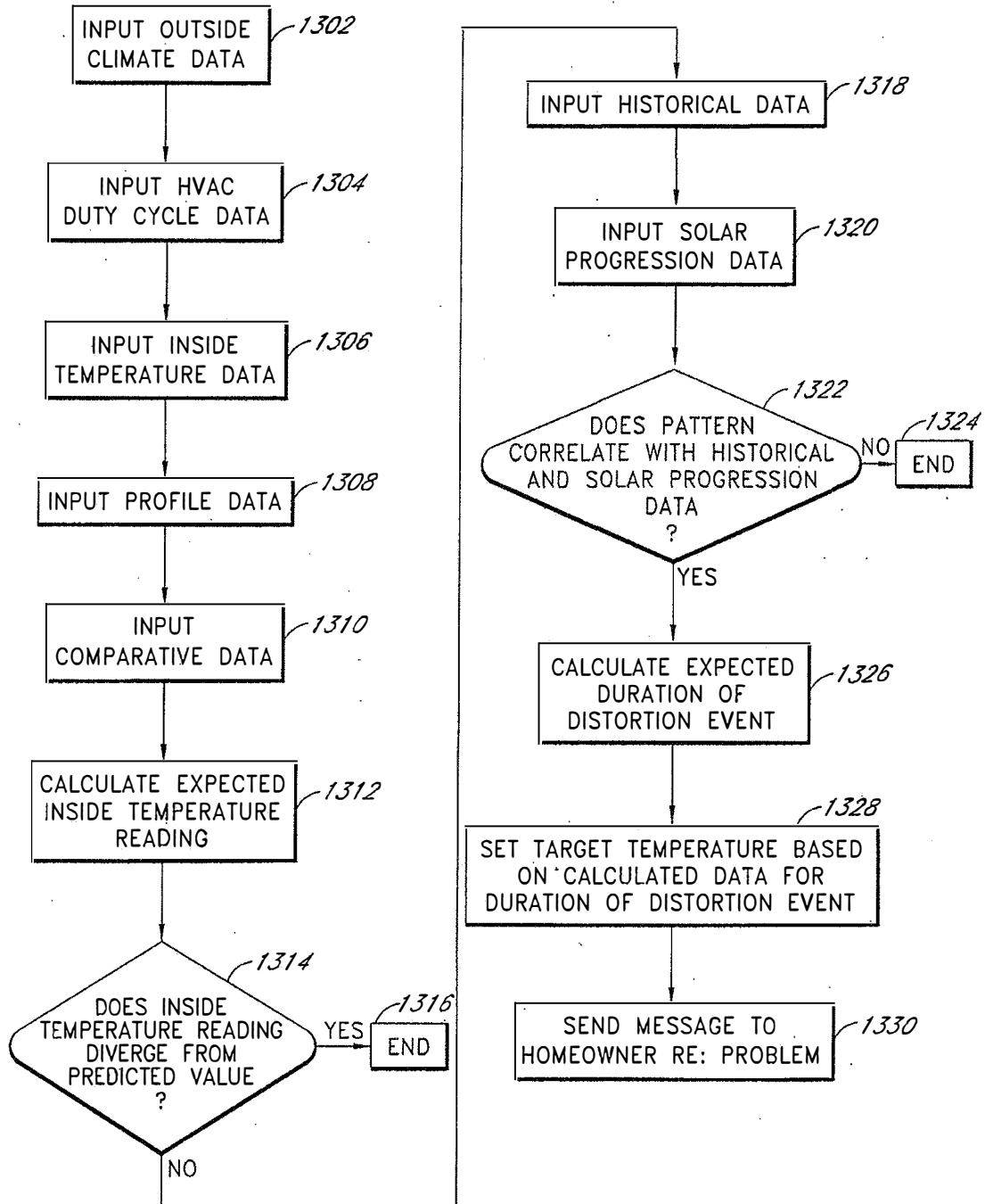


FIG. 13

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	John	Douglas	STEINBERG		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Millbrae	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	873 Hacienda Way				
Address 2					
City	Millbrae	State/Province	CA		
Postal Code	94030	Country	US		
Inventor 2					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Scott	Douglas	HUBLOU		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Redwood City	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	747 Lakeview Way				
Address 2					
City	Redwood City	State/Province	CA		
Postal Code	94062	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

☐ An Address is being provided for the correspondence information of this application.

Customer Number	144465		
Email Address	dan@tannerip.com	Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		
Attorney Docket Number	230-002-CON	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	13	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	144465		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Continuation of	16806779	2020-03-02		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16806779	Continuation of	16374083	2019-04-03	10612983	2020-04-07
Prior Application Status	Abandoned		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
16374083	Continuation of	15905251	2018-02-26		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15905251	Division of	14731221	2015-06-04	9939333	2018-04-10
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14731221	Continuation of	13861189	2013-04-11	9057649	2015-06-16
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13861189	Continuation of	13230610	2011-09-12	8423322	2013-04-06
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13230610	Continuation of	12211690	2008-09-16	8019567	2011-09-13
Prior Application Status	Expired		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
12211690	Claims benefit of provisional	60994011	2007-09-17		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Remove Access Code ⁱ (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	230-002-CON
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant 1			
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.			
Clear			
☒ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor	
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor:			
If the Applicant is an Organization check here. ☒			
Organization Name	ECOFACOR, INC.		
Mailing Address Information For Applicant:			
Address 1	441 California Avenue #2		
Address 2			
City	Palo Alto	State/Province	CA
Country	US	Postal Code	94306
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country ⁱ		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Daniel A. Tanner, III/		Date (YYYY-MM-DD)	2022-03-21
First Name	Daniel	Last Name	TANNER	Registration Number
54734				

Additional Signature may be generated within this form by selecting the Add button.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	230-002-CON
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

- 1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
- 2 A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
- 4 A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
- 5 A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
- 6 A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
- 7 A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
- 8 A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
- 9 A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM
As the below named inventor, I hereby declare that: This declaration is directed to: ☐ The attached application, or 13/861189 ☒ United States application or PCT international application number April 11, 2013 filed on _____ The above-identified application was made or authorized to be made by me. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both. WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft: Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.	
LEGAL NAME OF INVENTOR Inventor: <u>John Douglas Steinberg</u> Date (Optional): <u>12/12/13</u> Signature: _____	
Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEM
--------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number 13/861189
April 11, 2013
 filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

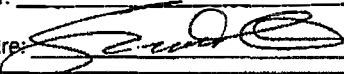
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Scott Douglas Hublou Date (Optional): 12/12/13

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: ECOFACOR, INC.Application No./Patent No.: New U.S. Patent Application Filed/Issue Date: 20 220 3 -2 1Titled: SYSTEM AND METHOD FOR EVALUATING CHANGES IN THE EFFICIENCY OF AN HVAC SYSTEMECOFACOR, INC., a CORPORATION

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 025711, Frame 0873, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Daniel A. Tanner, III/

2022-03-21

Signature

Date

Daniel A. Tanner, III

54734

Printed or Typed Name

Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:



Practitioners associated with Customer Number:

144465

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:



The address associated with Customer Number: 144465

OR



Firm or individual name

Address

City

State

Zip

Country

Telephone

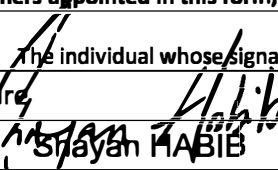
Email

Assignee name and address:

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature 	Date 2022-03-18
Name Syayon HABIB	Telephone 646-344-0736
Title CEO -- ECOFACTOR, INC.	

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.